OLYMPUS®

OPERATION MANUAL

INSTRUCTIONS

EVIS EXERA GASTROINTESTINAL VIDEOSCOPE

OLYMPUS GIF TYPE **XP160**
OLYMPUS GIF TYPE **160**
OLYMPUS GIF TYPE **Q160**
OLYMPUS GIF TYPE **1TQ160**
OLYMPUS GIF TYPE **XTQ160**

EVIS EXERA COLONOVIDEOSCOPE

OLYMPUS CF TYPE **Q160L/I**
OLYMPUS CF TYPE **Q160AL/I**
OLYMPUS PCF TYPE **160AL/I**

EVIS EXERA SIGMOIDOVIDEOSCOPE

OLYMPUS CF TYPE **Q160S**

Refer to the endoscope's companion manual, the "REPROCESSING MANUAL" whose cover lists the model of your endoscope, for reprocessing information.

USA: CAUTION: Federal law restricts this device to sale by or on the order of a physician.

CE 0197

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Symbols

The meaning(s) of the symbol(s) shown on the package with the components, the back cover of this instruction manual and/or this instrument are as follows:

Refer to instructions.

Endoscope

TYPE BF applied part

Manufacturer

Authorised representative in the European Community

Important Information — Please Read Before Use

Intended use

These instruments have been designed to be used with an Olympus video system center, light source, documentation equipment, video monitor, endo-therapy accessories (such as a biopsy forceps) and other ancillary equipment.

Use the GIF-XP160, GIF-160, GIF-Q160, GIF-1TQ160, GIF-XTQ160 for endoscopy and endoscopic surgery within the upper digestive tract (including the esophagus, stomach and duodenum).

Use the CF-Q160L/I, CF-Q160AL/I, PCF-160AL/I for endoscopy and endoscopic surgery within the lower digestive tract (including the anus, rectum, sigmoid colon, colon and ileocecal valve).

Use the CF-Q160S for endoscopy and endoscopic surgery within the lower digestive tract (including the anus, rectum and sigmoid colon).

Do not use these instruments for any purpose other than their intended uses.

Applicability of endoscopy and endoscopic treatment

If there is an official standard on the applicability of endoscopy and endoscopic treatment that is defined by the hospital's administration or other official institutions such as academic societies on endoscopy, follow that standard.
Before starting endoscopy and endoscopic treatment, thoroughly evaluate its properties, purposes, effects, and possible risk (their natures, extent and probability). Perform endoscopy and endoscopic treatment only when its potential benefits are greater than its risks.
Fully explain to the patient the potential benefits and risks of the endoscopy and endoscopic treatment as well as any examination/treatment methods that can be performed in its place, and perform the endoscopy and endoscopic treatment only after obtaining the consent of the patient.
Even after starting the endoscopy and endoscopic treatment, continue to evaluate the potential benefits and risks, and immediately stop the endoscopy/treatment and take proper measures if the risks to the patient become greater than the potential benefits.

Instruction manual

This instruction manual contains essential information on using this instrument safely and effectively. Before use, thoroughly review this manual and the manuals of all equipment which will be used during the procedure and use the equipment as instructed.

Note that the complete instruction manual set for this endoscope consists of this manual and the “REPROCESSING MANUAL” whose cover lists the model of your endoscope. It also accompanied the endoscope at shipment.

Keep this and all related instruction manuals in a safe, accessible location.
If you have any questions or comments about any information in this manual, please contact Olympus.

User qualifications

The operator of this instrument must be a physician or medical personnel under the supervision of a physician and must have received sufficient training in clinical endoscopic technique. This manual, therefore, does not explain or discuss clinical endoscopic procedures. For details on the clinical endoscopic procedures, the physician and operator are requested to form judgments from their viewpoints as specialists.

Instrument compatibility

Refer to the “System chart” in the Appendix to confirm that this instrument is compatible with the ancillary equipment being used. Using incompatible equipment can result in patient or operator injury and/or equipment damage.

This instrument complies with EMC standard for medical electrical equipment; edition 2 (IEC 60601-1-2: 2001). However, when connected with an instrument that complies with EMC standard for medical electrical equipment; edition 1 (IEC 60601-1-2: 1993), the whole system complies with edition 1.

Reprocessing before the first use/reprocessing and storage after use

This instrument was not cleaned, disinfected or sterilized before shipment. Before using this instrument for the first time, reprocess it according to the instructions given in the endoscope's companion manual, the "REPROCESSING MANUAL" whose cover lists the model of your endoscope.

After using this instrument, reprocess and store it according to the instructions given in the endoscope's companion reprocessing manual. Improper and/or incomplete reprocessing or storage can present an infection control risk, cause equipment damage or reduce performance.

Spare equipment

Be sure to prepare another endoscope to avoid that the examination will be interrupted due to equipment failure or malfunction.

Repair and modification

This instrument does not contain any user-serviceable parts. Do not disassemble, modify or attempt to repair it; patient or operator injury and/or equipment damage can result. This instrument is to be repaired by Olympus technicians only.

Signal words

The following signal words are used throughout this manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential equipment damage.

NOTE

Indicates additional helpful information.

Warnings and cautions

Follow the warnings and cautions given below when handling this instrument. This information is to be supplemented by the warnings and cautions given in each chapter.

WARNING

- After using this instrument, reprocess and store it according to the instructions given in the endoscope's companion reprocessing manual. Using improperly or incompletely reprocessed or stored instruments may cause patient cross-contamination and/or infection.
- Do not strike, bend, hit, pull, twist, or drop the endoscope's distal end, insertion tube, bending section, control section, universal cord, or endoscope connector of the endoscope with excessive force. The endoscope may be damaged and could cause patient injury, burns, bleeding and/or perforations. It could also cause parts of the endoscope to fall off inside the patient.
- Never perform angulation control forcibly or abruptly. Never forcefully pull, twist or rotate the angulated bending section. Patient injury, bleeding and/or perforation can result. It may also become impossible to straighten the bending section during an examination.
- Never insert or withdraw the endoscope's insertion tube while the bending section is locked in position. Patient injury can result.
- Do not touch the light guide of the endoscope connector immediately after removing it from the light source because it is extremely hot. Operator or patient burns can result.
- Never perform flexibility adjustment, operate the bending section, feed air or perform suction, insert or withdraw the endoscope's insertion tube without viewing the endoscopic image. Never use endo-therapy accessories without viewing the endoscopic image. Patient injury can result.

- Never perform flexibility adjustment, operate the bending section, feed air or perform suction, insert or withdraw the endoscope's insertion tube while the image is frozen. Never use endo-therapy accessories while the image is frozen. Patient injury can result.
- Regardless of the flexibility of the endoscope's insertion tube, never insert or withdraw it with excessive force. Otherwise, patient injury could result.

CAUTION

- Do not pull the universal cord during an examination. The endoscope connector will be pulled out from the output socket of the light source and the endoscopic image will not be visible.
- Do not coil the insertion tube or universal cord into a diameter of less than 12 cm. Equipment damage can result.
- Do not touch the electrical contacts inside the electrical connector. CCD damage may result.
- Do not apply shock to the distal end of the insertion tube, particularly the objective lens surface at the distal end. Visual abnormalities may result.
- Do not twist or bend the bending section with your hands. Equipment damage may result.
- Do not squeeze the bending section forcefully. The covering of the bending section may stretch or break and cause water leaks.
- Turn the video system center OFF before connecting or disconnecting the videoscope cable from the electrical connector on the endoscope. Turn the switch ON or OFF only when the videoscope cable is connected to both the video system center and electrical connector on the endoscope. Failure to do so can result in equipment damage, including destruction of the CCD.
- The endoscope's remote switches cannot be removed from the control section. Pressing, pulling or twisting them with excessive force can break the switches and/or may cause water leaks.

- If remote switch 1 does not return to the OFF position after being pressed strongly from the side, gently pull the switch upwards to return it to the OFF position.
- Do not hit or bend the electrical contacts on the endoscope connector. The connection to the light source may be impaired and faulty contact can result.
- Do not attempt to bend the endoscope's insertion tube with excessive force. Otherwise, the insertion tube may be damaged.
- Do not attempt to bend the endoscope's insertion tube with excessive force unless flexibility is at the stiffest position. Otherwise, the insertion tube may be damaged.
- The endoscope contains a memory chip that stores information about the endoscope and communicates this information to the CV-160. Although the memory chip is durable, damage will prevent data from being backed up on it. When data are lost or damaged, contact Olympus.
- Electromagnetic interference may occur on this instrument near equipment marked with the following symbol or other portable and mobile RF (Radio Frequency) communications equipment such as cellular phones. If electromagnetic interference occurs, mitigation measures may be necessary, such as reorienting or relocating this instrument, or shielding the location.

Examples of inappropriate handling

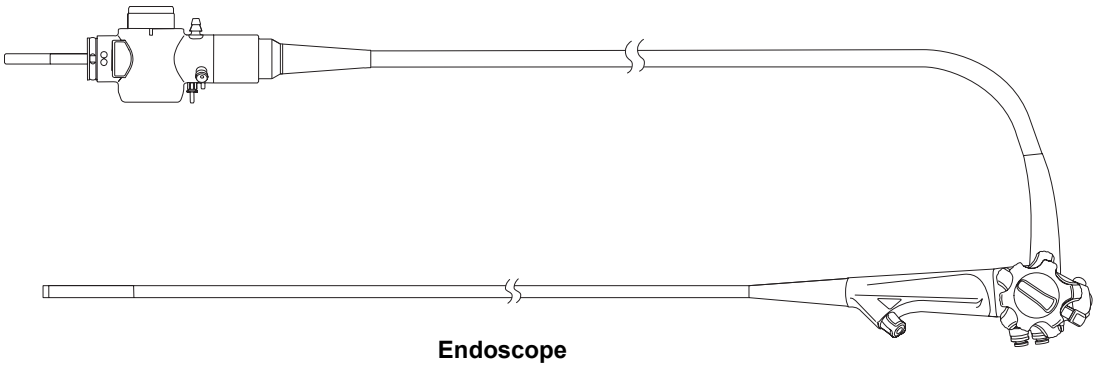
Details on clinical endoscopic technique are the responsibility of trained specialists. Patient safety in endoscopic examinations and endoscopic treatment can be ensured through appropriate handling by the physician and the medical facility. Examples of inappropriate handling are given below;

- Over-insufflating the lumen may cause patient pain and/or perforation.
- Applying prolonged suction with the distal end in contact with the mucosal surface may cause bleeding or suction lesions.
- Retroflexing the endoscope within the esophagus or duodenal bulb may cause mucosal trauma or impaction of the endoscope (for GIF models only).

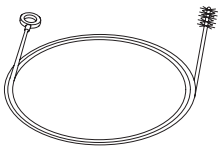
- Inserting, withdrawing and using endo-therapy accessories without a clear endoscopic image may cause burns or perforation.
- Inserting or withdrawing the endoscope, feeding air, applying suction or operating the bending section without a clear endoscopic image may cause patient injury.

Chapter 1 Checking the Package Contents

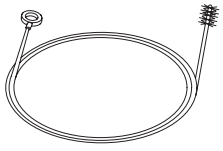
Match all items in the package with the components shown below. Inspect each item for damage. If the instrument is damaged, a component is missing or you have any questions, do not use the instrument; immediately contact Olympus.
This instrument was not disinfected or sterilized before shipment.
Before using this instrument for the first time, reprocess it according to the instructions given in the endoscope's companion manual, the "REPROCESSING MANUAL" whose cover lists the model of your endoscope.



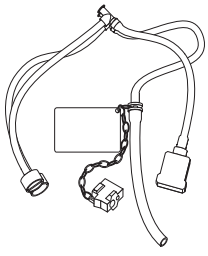
Endoscope



Channel cleaning brush (BW-20T)



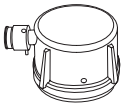
Channel cleaning brush (BW-17K for GIF-XTQ160 only)



Injection tube (MH-946)

Channel-opening cleaning brush (MH-507)

AW channel cleaning adapter (MH-948)

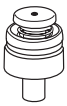


Water-resistant cap (MH-553)

Mouthpiece (MA-474, MB-142 for GIF-XP160, 1 pc. each)

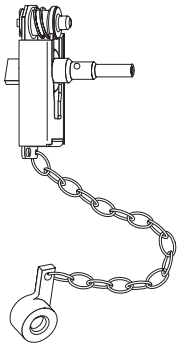
Mouthpiece (MB-142 for GIF-160, GIF-Q160, GIF-1TQ160, GIF-XTQ160, 2 pcs.)

Biopsy valve (MB-358, 10 pcs.)



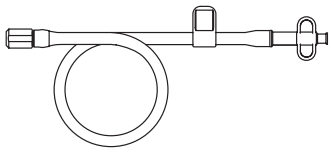
Suction valve (MH-443, 2 pcs.)

Air/water valve (MH-438, 2 pcs.)

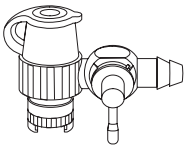


Channel plug (MH-944)

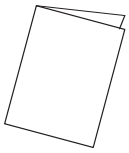
Suction cleaning adapter (MH-856)



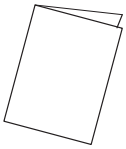
Auxiliary water tube (MAJ-855 for endoscopes with auxiliary water feeding only)



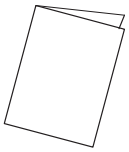
Forceps Suction Plug (T-Plug) (MH-405 for GIF-XTQ160 only)



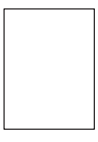
Operation manual



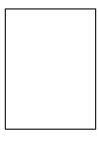
Reprocessing manual



Instruction Manual (Forceps Suction Plug, for GIF-XTQ160 only)



Instructions (Leaflet type, for CF-Q160AL/I, PCF-160AL/I only)

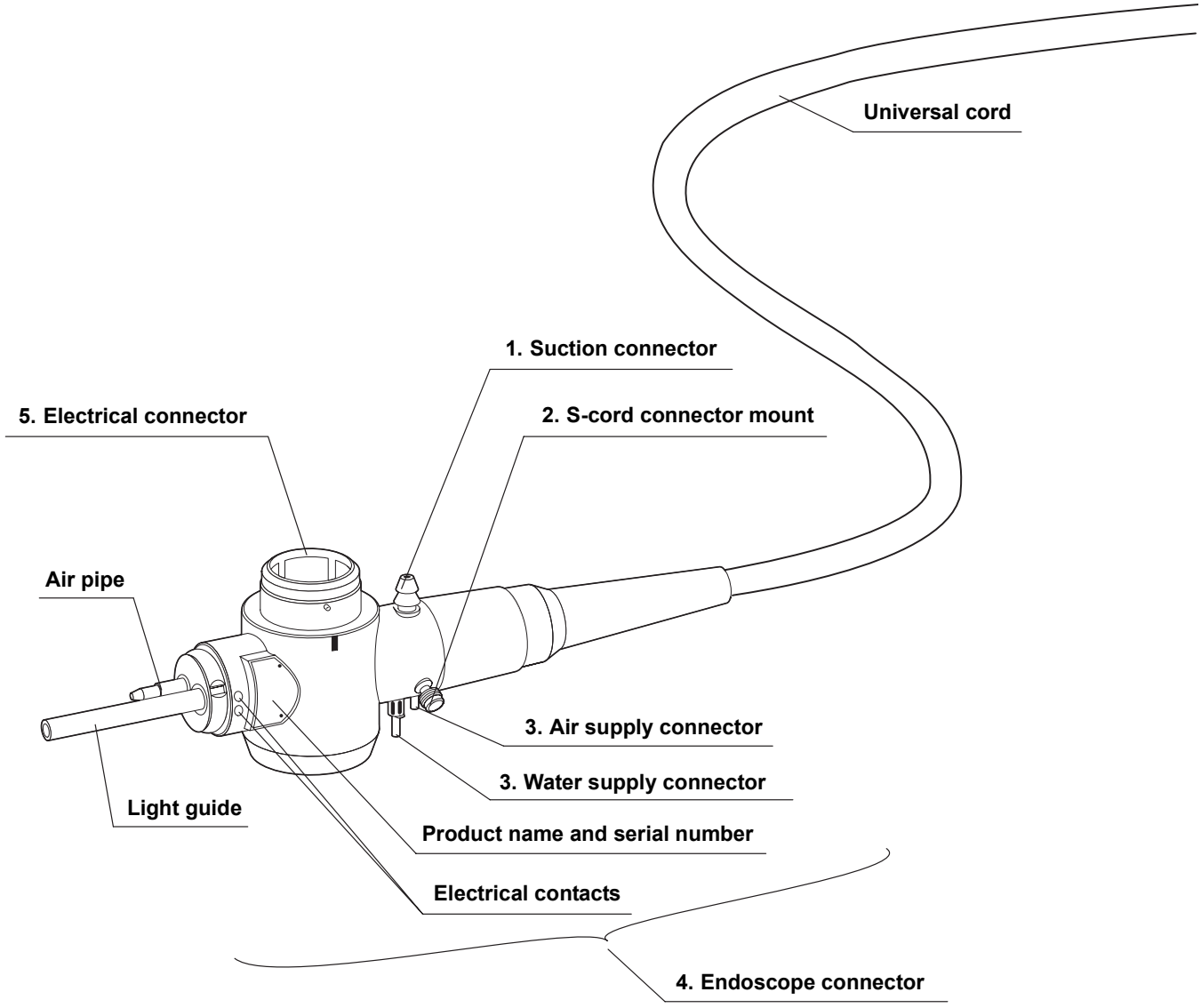


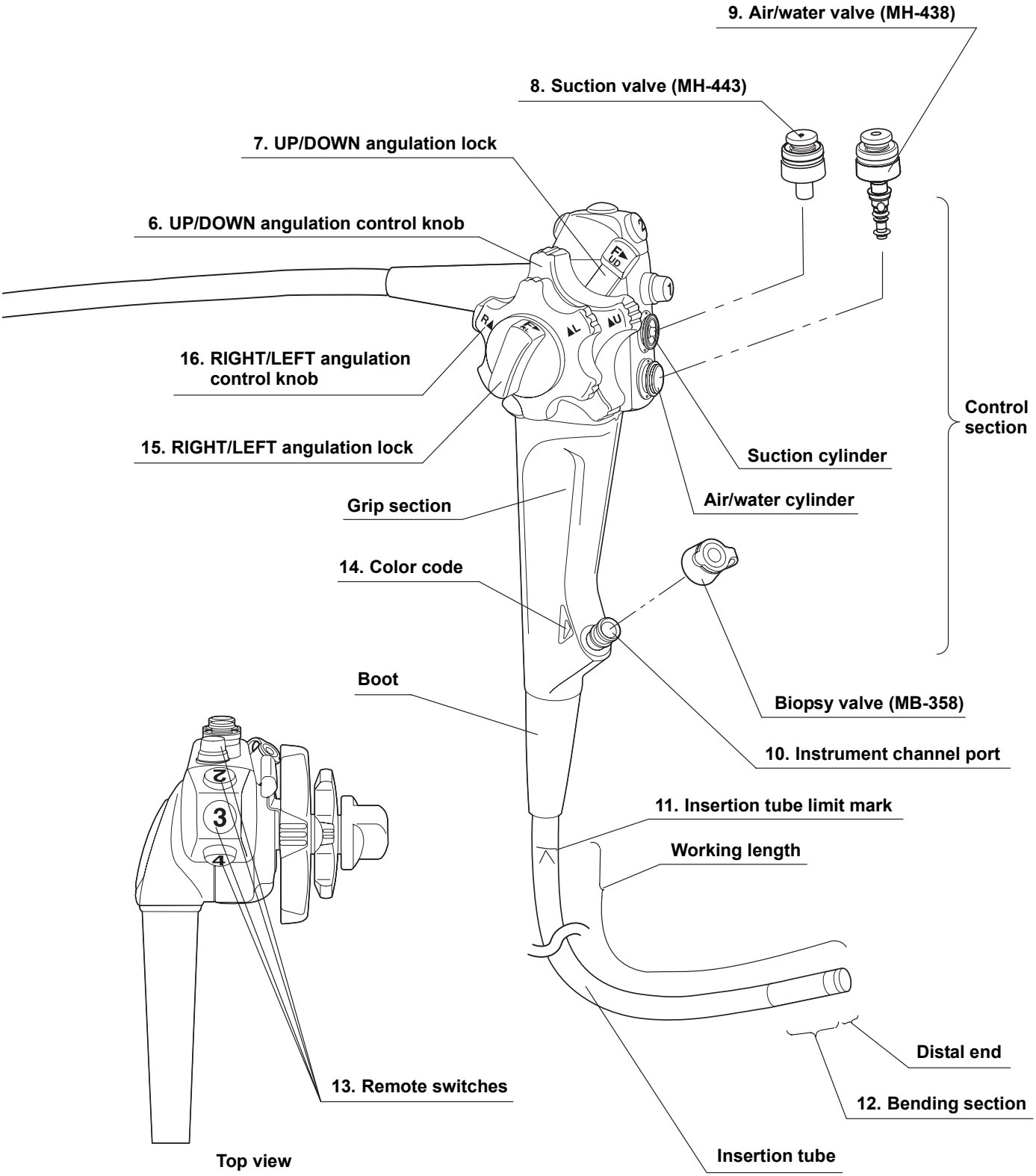
Instructions (Leaflet type, for GIF-XTQ160 only)

Chapter 2 Instrument Nomenclature and Specifications

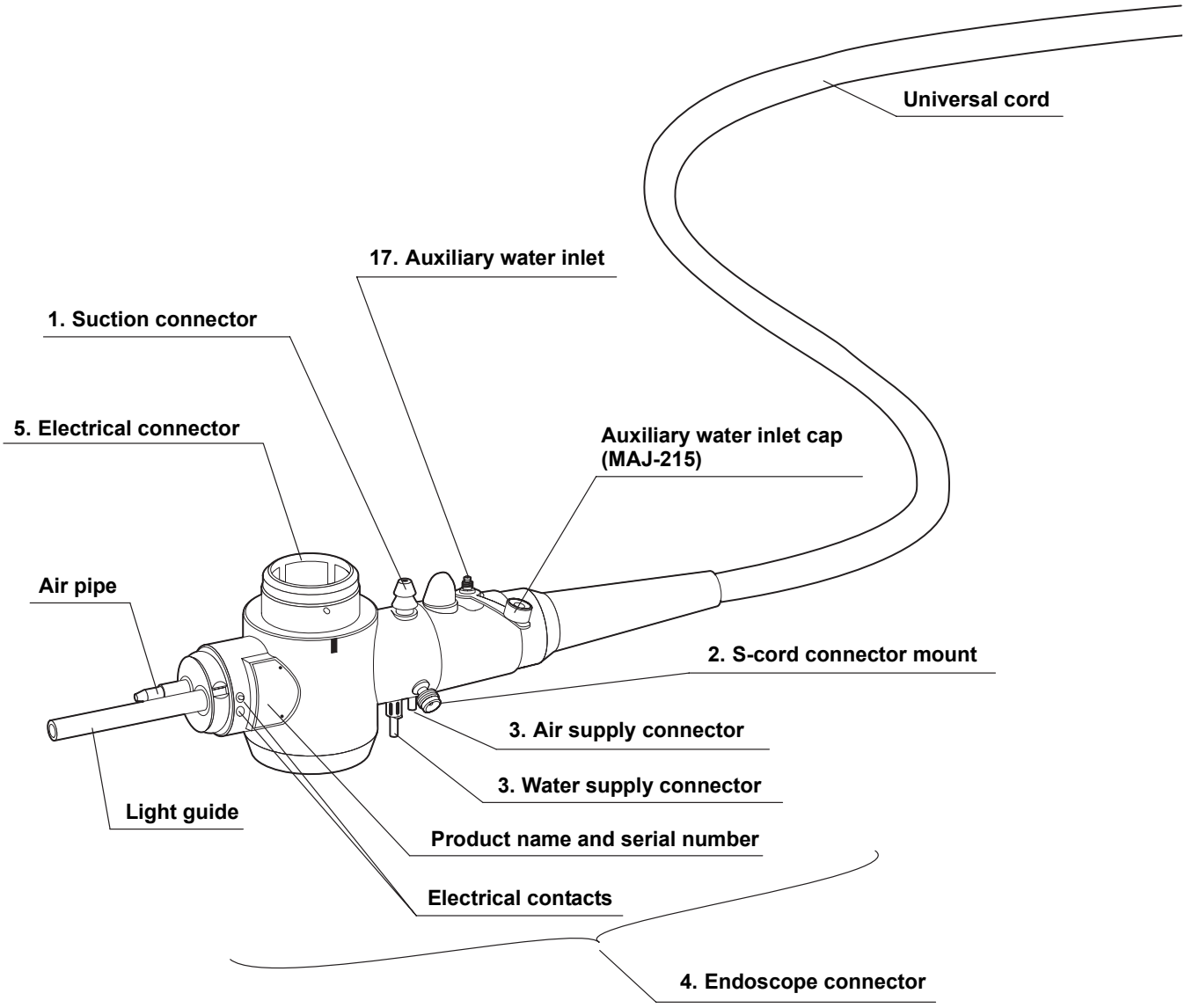
2.1 Nomenclature

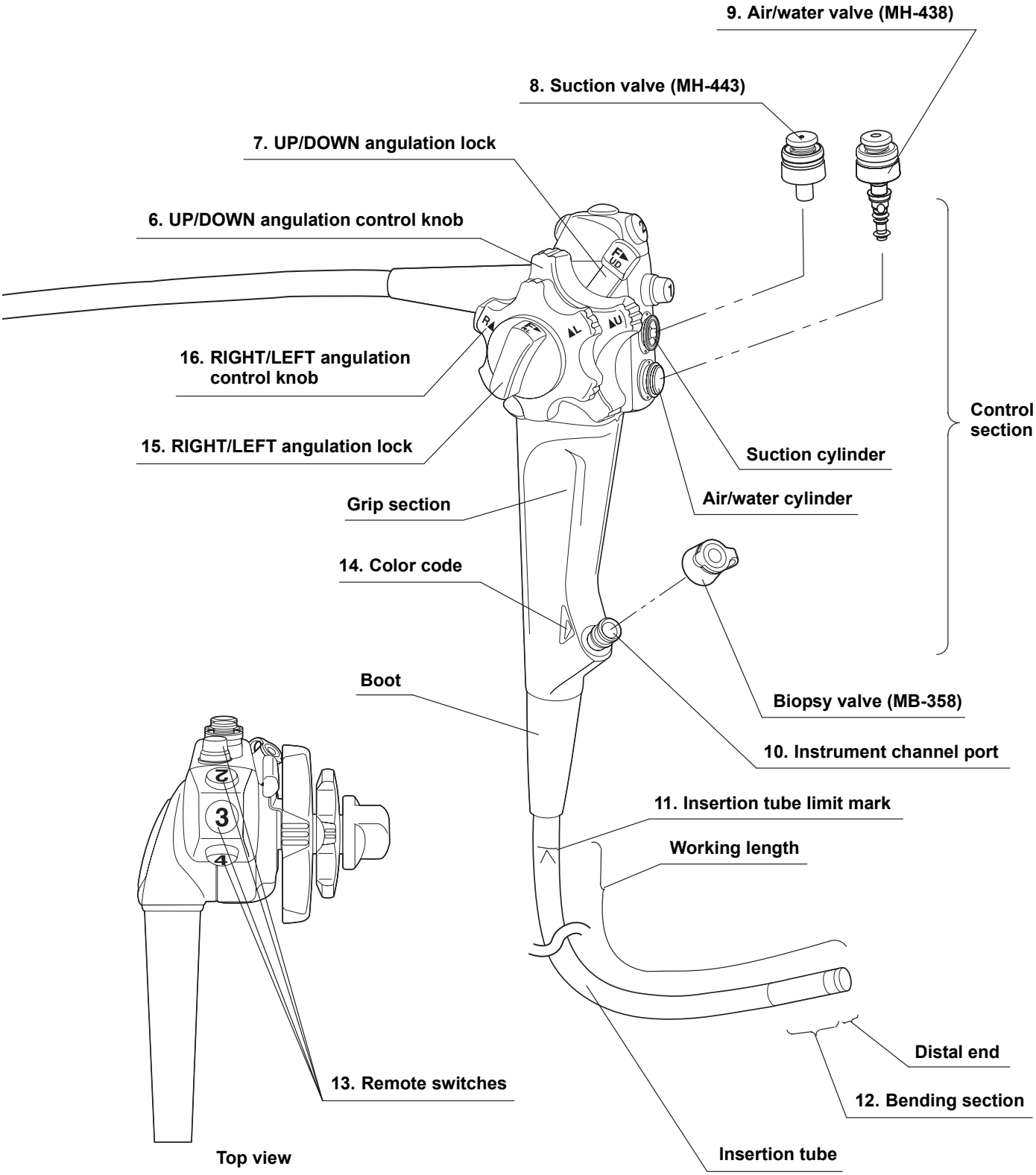
- **GIF-XP160, GIF-160, GIF-Q160**




9. Air/water valve (MH-438)
8. Suction valve (MH-443)
7. UP/DOWN angulation lock
6. UP/DOWN angulation control knob
16. RIGHT/LEFT angulation control knob
15. RIGHT/LEFT angulation lock
Grip section
14. Color code
Boot
13. Remote switches
Top view
Suction cylinder
Air/water cylinder
Control section
Biopsy valve (MB-358)
10. Instrument channel port
11. Insertion tube limit mark
Working length
Distal end
12. Bending section
Insertion tube

❍ GIF-1TQ160, CF-Q160L/I, CF-Q160S

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Suction cylinder
Air/water cylinder
Biopsy valve (MB-358)
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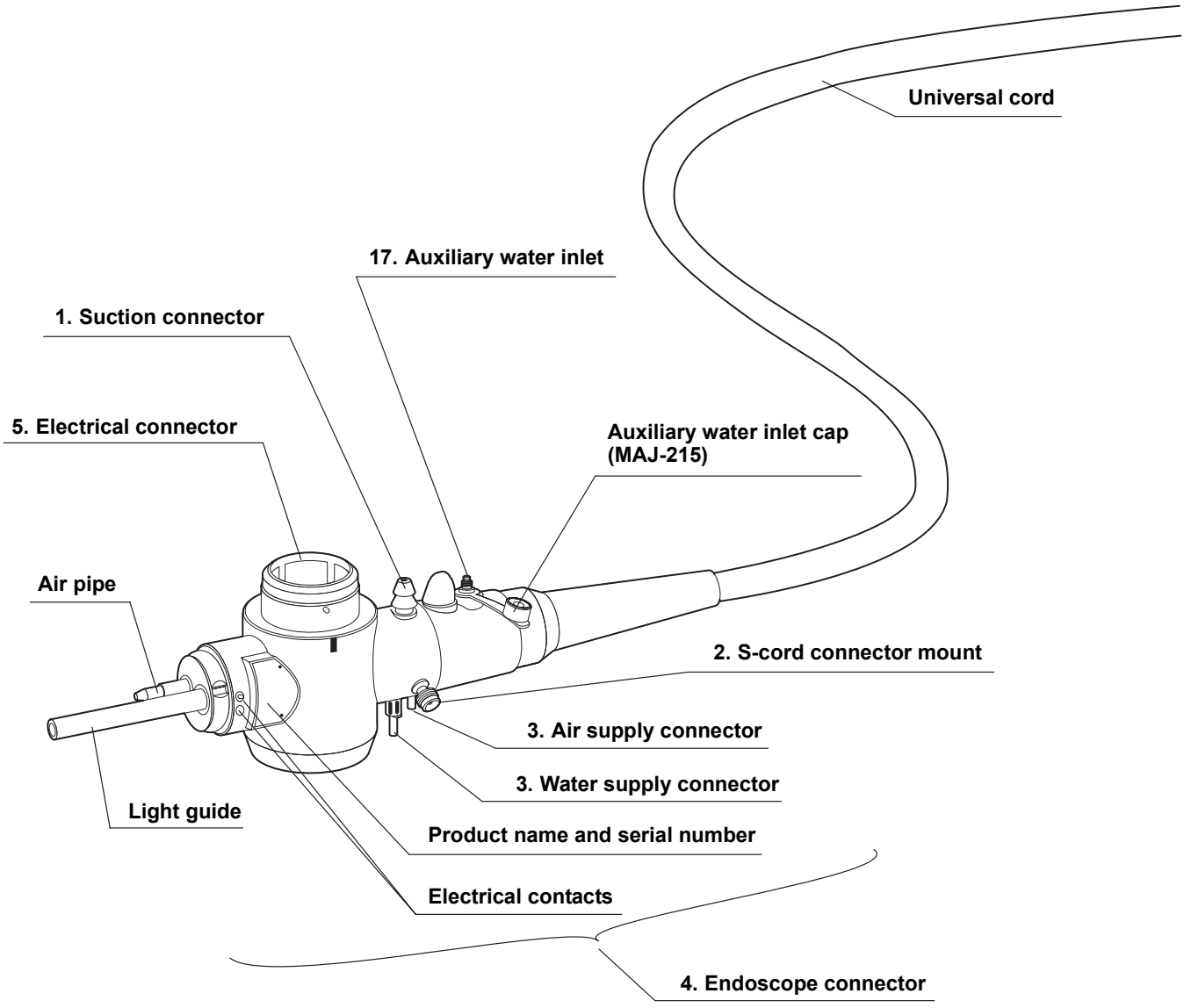
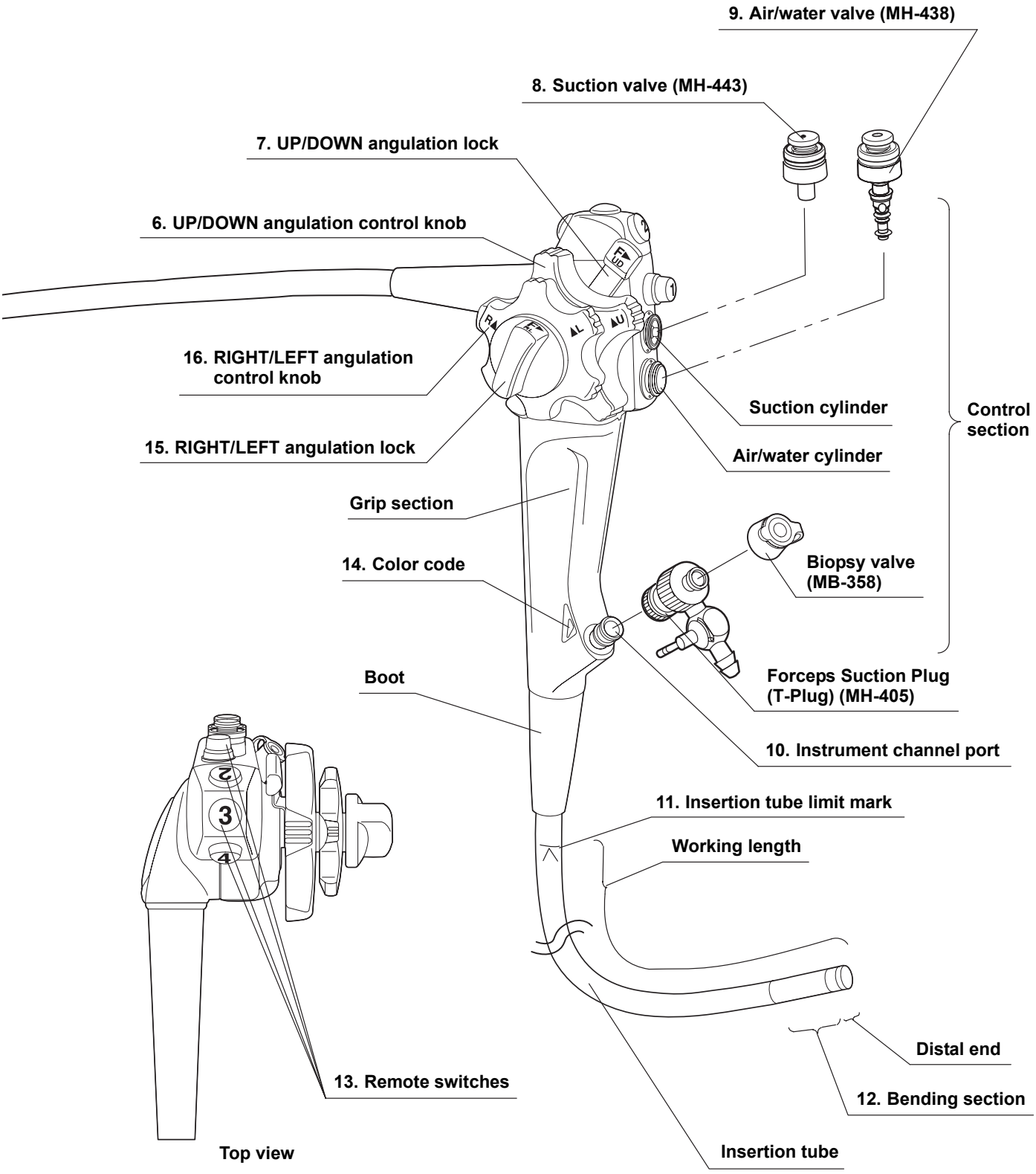
11. Insertion tube limit mark
Working length
Distal end
12. Bending section
Insertion tube
13. Remote switches
Top view

❍ GIF-XTQ160


Universal cord
17. Auxiliary water inlet
1. Suction connector
5. Electrical connector
Auxiliary water inlet cap
(MAJ-215)
Air pipe
2. S-cord connector mount
3. Air supply connector
3. Water supply connector
Light guide
Product name and serial number
Electrical contacts
4. Endoscope connector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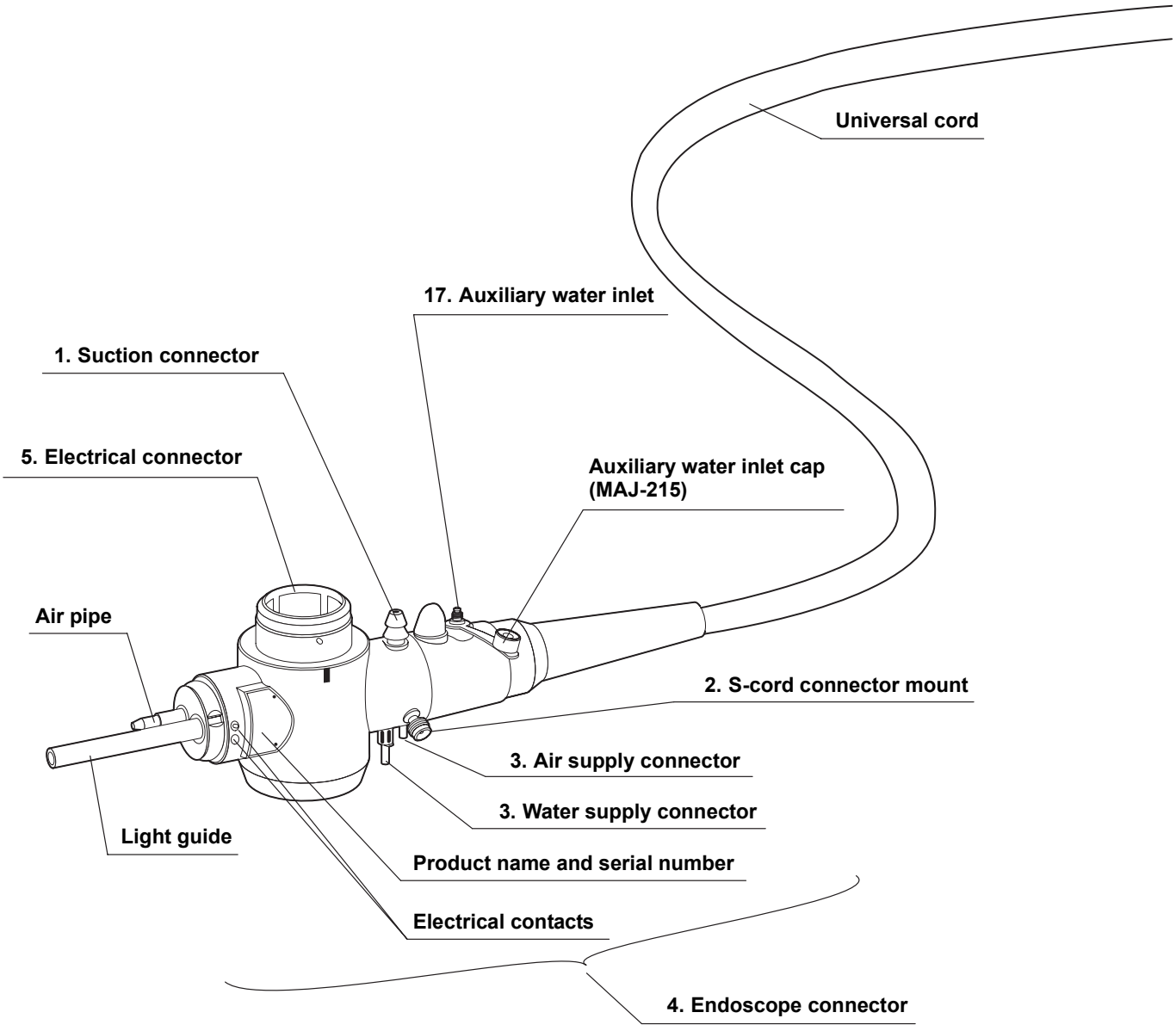
Suction cylinder
Air/water cylinder
Control section
Grip section
14. Color code
Biopsy valve (MB-358)
Boot
Forceps Suction Plug (T-Plug) (MH-405)
10. Instrument channel port
11. Insertion tube limit mark
Working length
Distal end
12. Bending section
13. Remote switches
Insertion tube
Top view

CF-Q160AL/I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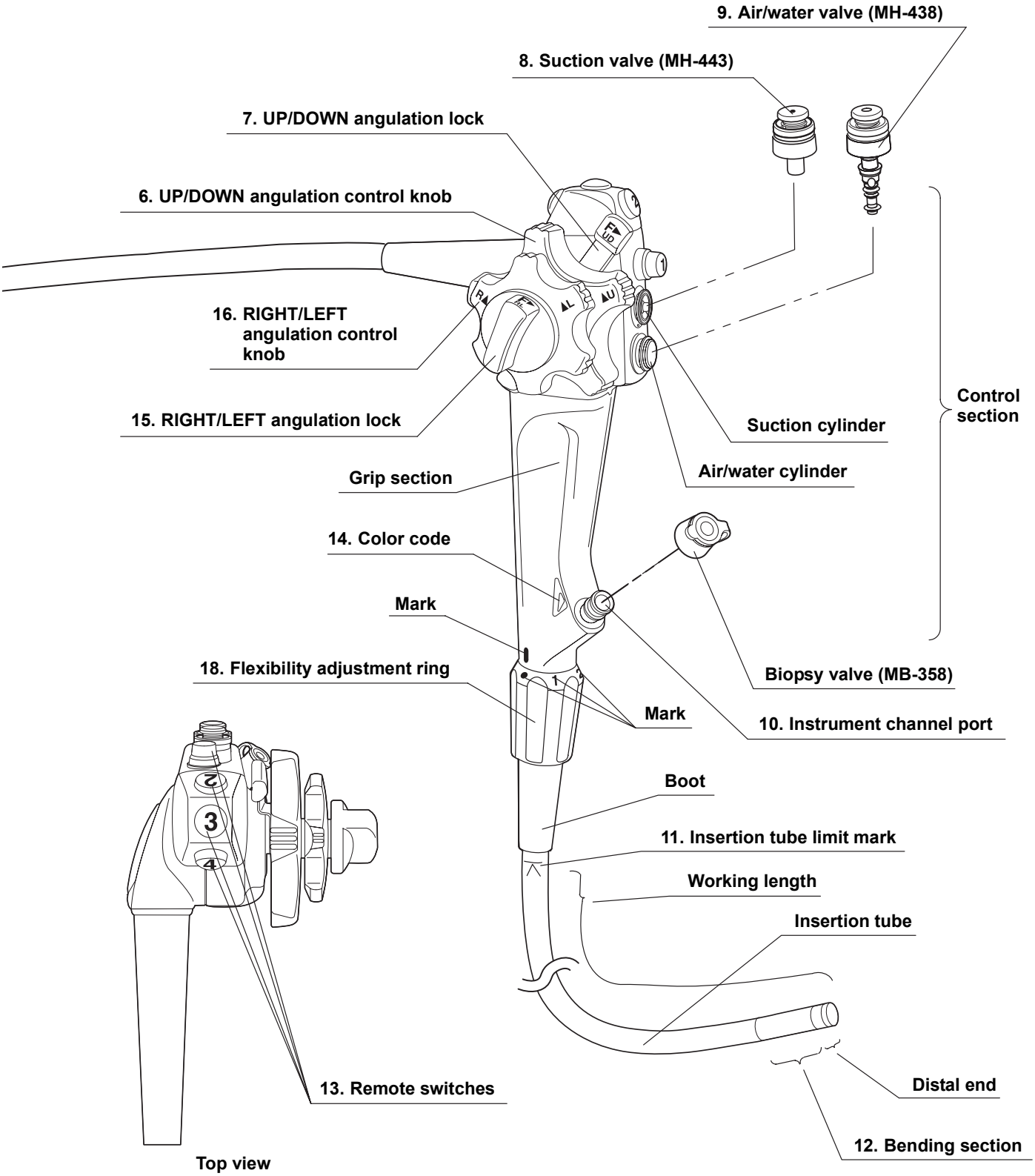
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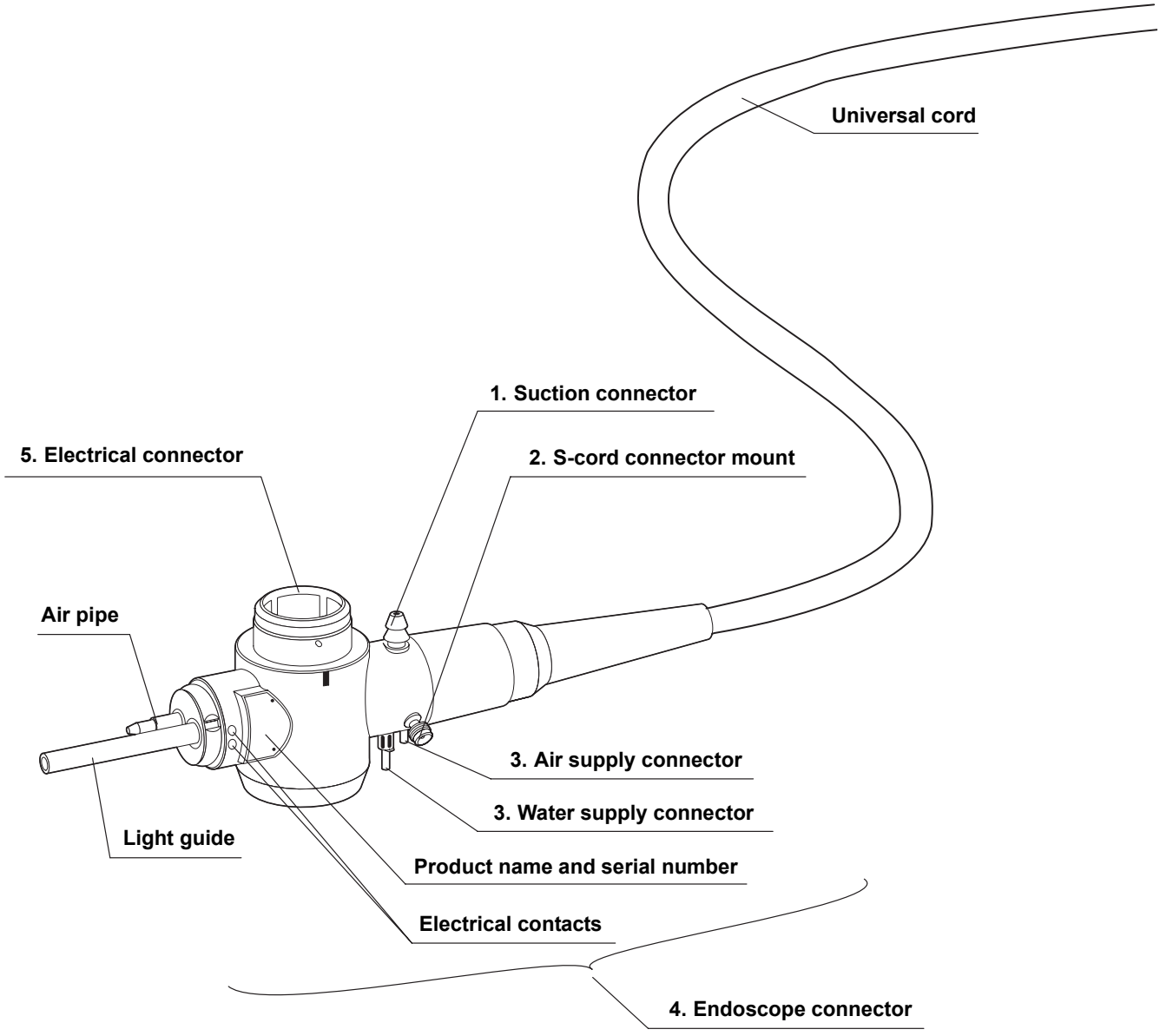
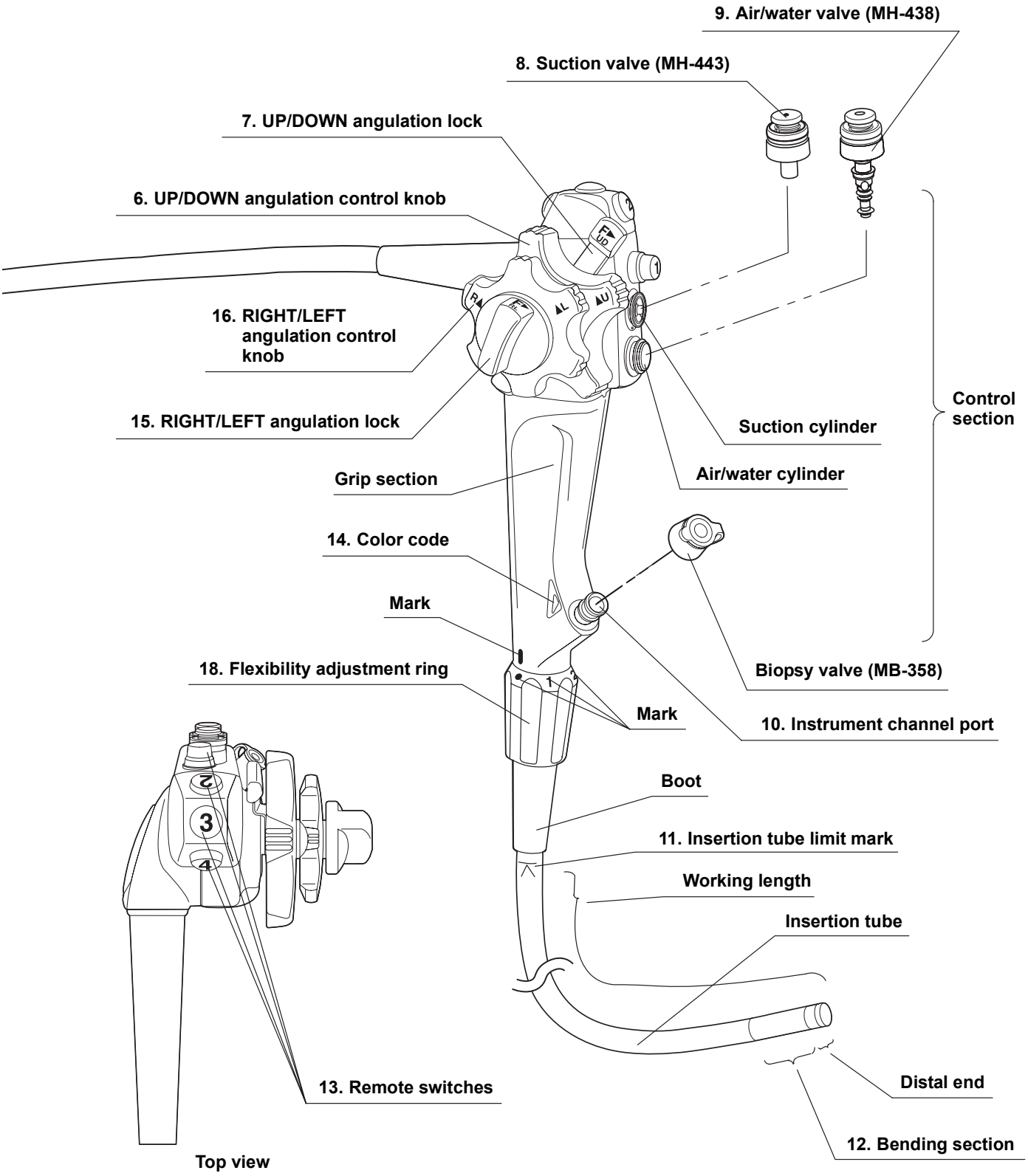
16. RIGHT/LEFT angulation control knob
15. RIGHT/LEFT angulation lock
Grip section
14. Color code
Mark
18. Flexibility adjustment ring
Mark
Boot
11. Insertion tube limit mark
Working length
Insertion tube
Distal end
12. Bending section
13. Remote switches
Top view
Suction cylinder
Air/water cylinder
Biopsy valve (MB-358)
10. Instrument channel port
Control section

PCF-160AL/I


Universal cord
1. Suction connector
5. Electrical connector
2. S-cord connector mount
Air pipe
3. Air supply connector
3. Water supply connector
Light guide
Product name and serial number
Electrical contacts
4. Endoscope connector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13. Remote switches
Distal end
12. Bending section
Top view
Suction cylinder
Air/water cylinder
Biopsy valve (MB-358)
10. Instrument channel port
Control section

2.2 Endoscope functions

1. **Suction connector**
   This connector connects the endoscope to the suction tube of the suction pump.
2. **S-cord connector mount**
   This mount connects the endoscope with the Olympus electrosurgical unit via the S-cord. The S-cord conducts leakage current from the endoscope to the electrosurgical unit. To connect the S-cord, refer to the instruction manual for the electrosurgical unit.
3. **Water supply connector and air supply connector**
   These connectors connect the endoscope to the water container via the water container tube, to supply water to the distal end of the endoscope.
4. **Endoscope connector**
   This connector connects the endoscope to the output socket of the light source and transmits light from the light source to the endoscope.
5. **Electrical connector**
   This connector connects the endoscope to the video system center via the videoscope cable. The endoscope contains a memory chip that stores information about the endoscope and communicates this information to the video system center CV-160. For more details, refer to the instruction manual of the CV-160.
6. **UP/DOWN angulation control knob**
   When this knob is turned in the "▲U" direction, the bending section moves UP; when the knob is turned in the "D▲" direction, the bending section moves DOWN.
7. **UP/DOWN angulation lock**
   Moving this lock in the "F▶" direction frees angulation. Moving the lock in the opposite direction locks the bending section at any desired position.
8. **Suction valve (MH-443)**
   This valve is depressed to activate suction. The valve is used to remove any fluid, debris, flatus or air from the patient.
9. **Air/water valve (MH-438)**
   The hole in this valve is covered to insufflate air and the valve is depressed to feed water for lens washing. It also can be used to feed air to remove any fluid or debris adhering to the objective lens.

10. **Instrument channel port**

The instrument channel port functions as:

- channel for the insertion of endo-therapy accessories
- suction channel
- fluid feed channel (from a syringe via the biopsy valve)

11. **Insertion tube limit mark**

This mark shows the maximum point to which the endoscope may be inserted into the patient's body.

12. **Bending section**

This section moves the distal end of the endoscope when the UP/DOWN and RIGHT/LEFT angulation control knobs are operated.

13. **Remote switches 1 to 4**

The functions of the remote switches 1 to 4 can be selected on the video system center. When selecting the functions, refer to the instruction manual for the video system center.

14. **Color code**

This code is used to quickly determine the compatibility of endo-therapy accessories. The endoscope can be used with endo-therapy accessories that have the same color code.

- Blue: GIF-XP160
- Yellow: GIF-160, GIF-Q160, PCF-160AL/I
- Orange: GIF-1TQ160, GIF-XTQ160, CF-Q160L/I/S, CF-Q160AL/I

15. **RIGHT/LEFT angulation lock**

Turning this lock in the "F▶" direction frees angulation. Turning the lock in the opposite direction locks the bending section at any desired position.

16. **RIGHT/LEFT angulation control knob**

When this knob is turned in the "R▲" direction, the bending section moves RIGHT; when the knob is turned in the "▲L" direction, the bending section moves LEFT.

17. **Auxiliary water inlet (for endoscopes with auxiliary water feeding only)**

This inlet is connected to the auxiliary water tube. Feed water from this inlet through the auxiliary water channel when necessary, (e.g. when blood adheres to mucosa in the patient's body cavity). When the auxiliary water inlet is not being used, make sure that it is covered by the auxiliary water inlet cap.

18. **Flexibility adjustment ring (for CF-Q160AL/I, PCF-160AL/I only)**
Turn this ring to adjust the flexibility of the insertion tube.
When the "●" mark on the ring is aligned with the " ▌ " mark at the bottom of the grip section, the insertion tube has the softest condition. To decrease the flexibility, turn the ring so that the numbers are aligned with the " ▌ " mark ("3" corresponds to the stiffest condition). In the section between "●" and "3", insertion tube flexibility can be changed gradually regardless of the positions of other index markings ("1" and "2").

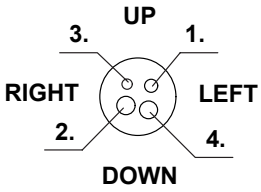
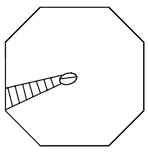
2.3 Specifications

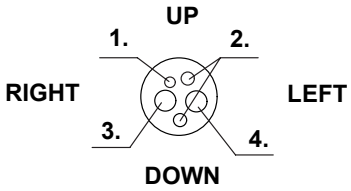
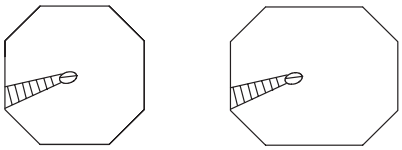
Operating environment

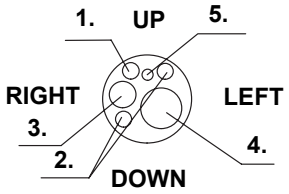
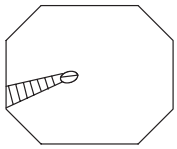
Operating environment	**Ambient temperature**	10 – 40°C (50 – 104°F)
	Relative humidity	30 – 85%
	Atmospheric pressure	700 – 1060 hPa (0.7 – 1.1 kgf/cm^2) (10.2 – 15.4 psia)

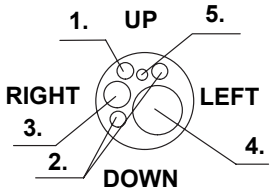
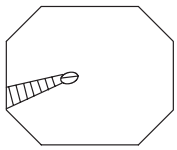
Specifications

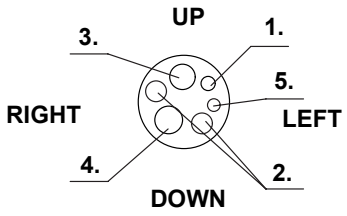
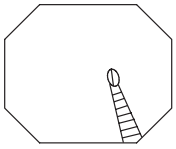
❍ Endoscope functions

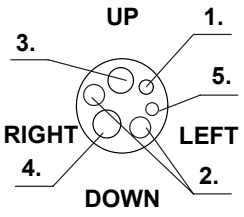
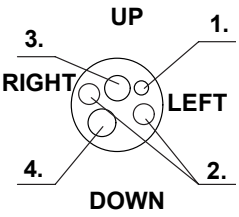
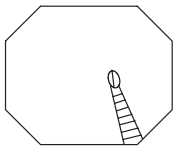
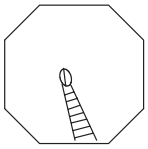
Model		GIF-XP160
Optical system	**Field of view**	120°
	Direction of view	Forward viewing
	Depth of field	3 – 100 mm
Insertion tube	**Distal end outer diameter**	ø 5.9 mm
	Distal end enlarged	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet 
	Insertion tube outer diameter	ø 5.9 mm
	Working length	1030 mm
Instrument channel	**Channel inner diameter**	ø 2 mm
	Minimum visible distance	3 mm from the distal end
	Direction from which endo-therapy accessories enter and exit the endoscopic image	
Air flow rate		25 cm^3/s Note: Standard when CLV-160 (high air pressure) is used.
Bending section	**Angulation range**	UP 180°, DOWN 90°, RIGHT 100°, LEFT 100°
Total length		1345 mm

Model		GIF-160	GIF-Q160
Optical system	**Field of view**	140°	
	Direction of view	Forward viewing	
	Depth of field	3 – 100 mm	
Insertion tube	**Distal end outer diameter**	ø 8.6 mm	ø 9.8 mm
	Distal end enlarged	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet  	
	Insertion tube outer diameter	ø 8.6 mm	ø 9.5 mm
	Working length	1030 mm	
Instrument channel	**Channel inner diameter**	ø 2.8 mm	
	Minimum visible distance	3 mm from the distal end	
	Direction from which endo-therapy accessories enter and exit the endoscopic image		
Air flow rate		25 cm^3/s Note: Standard when CLV-160 (high air pressure) is used.	
Bending section	**Angulation range**	UP 210°, DOWN 90°, RIGHT 100°, LEFT 100°	
Total length		1345 mm	

Model		GIF-1TQ160
Optical system	**Field of view**	140°
	Direction of view	Forward viewing
	Depth of field	3 – 100 mm
Insertion tube	**Distal end outer diameter**	ø 10.9 mm
	Distal end enlarged	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet 5. Auxiliary water channel 
	Insertion tube outer diameter	ø 11.3 mm
	Working length	1030 mm
Instrument channel	**Channel inner diameter**	ø 3.7 mm
	Minimum visible distance	4 mm from the distal end
	Direction from which endo-therapy accessories enter and exit the endoscopic image	
Air flow rate		25 cm^3/s Note: Standard when CLV-160 (high air pressure) is used.
Bending section	**Angulation range**	UP 210°, DOWN 90°, RIGHT 100°, LEFT 100°
Total length		1340 mm

Model		GIF-XTQ160
Optical system	**Field of view**	140°
	Direction of view	Forward viewing
	Depth of field	3 – 100 mm
Insertion tube	**Distal end outer diameter**	ø 12.9 mm
	Distal end enlarged	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet 5. Auxiliary water channel 
	Insertion tube outer diameter	ø 12.9 mm
	Working length	1030 mm
Instrument channel	**Channel inner diameter**	ø 6.0 mm
	Minimum visible distance	5 mm from the distal end
	Direction from which endo-therapy accessories enter and exit the endoscopic image	
Air flow rate		25 cm^3/s Note: Standard when CLV-160 (high air pressure) is used.
Bending section	**Angulation range**	UP 200°, DOWN 90°, RIGHT 100°, LEFT 100°
Total length		1360 mm

Model		**CF-Q160L/I**	**CF-Q160S**
Optical system	**Field of view**	140°	
	Direction of view	Forward viewing	
	Depth of field	3 – 100 mm	
Insertion tube	**Distal end outer diameter**	ø 12.8 mm	
	Distal end enlarged	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet 5. Auxiliary water channel  	
	Insertion tube outer diameter	ø 12.8 mm	ø 13.2 mm
	Working length	L: 1680 mm I: 1330 mm	S: 730 mm
Instrument channel	**Channel inner diameter**	ø 3.7 mm	
	Minimum visible distance	5 mm from the distal end	
	Direction from which endo-therapy accessories enter and exit the endoscopic image		
Air flow rate		25 cm^3/s Note: Standard when CLV-160 (high air pressure) is used.	
Bending section	**Angulation range**	UP 180°, DOWN 180°, RIGHT 160°, LEFT 160°	
Total length		L: 2000 mm I: 1650 mm	S: 1040 mm

Model		CF-Q160AL/I	PCF-160AL/I
Optical system	**Field of view**	140°	
	Direction of view	Forward viewing	
	Depth of field	3 – 100 mm	3 – 100 mm
Insertion tube	**Distal end outer diameter**	ø 12.8 mm	ø 11.3 mm
	Distal end enlarged	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet 5. Auxiliary water channel	1. Air/water nozzle 2. Light guide lens 3. Objective lens 4. Instrument channel outlet
			
	Insertion tube outer diameter	ø 12.8 mm	ø 11.5 mm
	Flexibility adjustment range	The flexibility in the stiffest condition is about twice that in the softest condition.	
	Working length	L: 1680 mm I: 1330 mm	
Instrument channel	**Channel inner diameter**	ø 3.7 mm	ø 3.2 mm
	Minimum visible distance	5 mm from the distal end	
	Direction from which endo-therapy accessories enter and exit the endoscopic image		
Air flow rate		25 cm^3/s Note: Standard when CLV-160 (high air pressure) is used.	
Bending section	**Angulation range**	UP 180°, DOWN 180°, RIGHT 160°, LEFT 160°	
Total length		L: 2005 mm I: 1655 mm	

Medical Device Directive	CE 0197	This device complies with the requirements of Directive 93/42/EEC concerning medical devices. Classification: Class II a
EMC	**Applied standard; IEC 60601-1-2: 2001**	This instrument complies with the standards listed in the left column. CISPR 11 of emission: Group 1, Class B This instrument complies with the EMC standard for medical electrical equipment; edition 2 (IEC 60601-1-2: 2001). However, when connecting to an instrument that complies with the EMC standard for medical electrical equipment; edition 1 (IEC 60601-1-2: 1993), the whole system complies with edition 1.
Year of manufacture	**2312345** ↑	The last digit of the year of manufacture is the second digit of the serial number.
Degree of protection against electric shock		TYPE BF applied part

Chapter 3 Preparation and Inspection

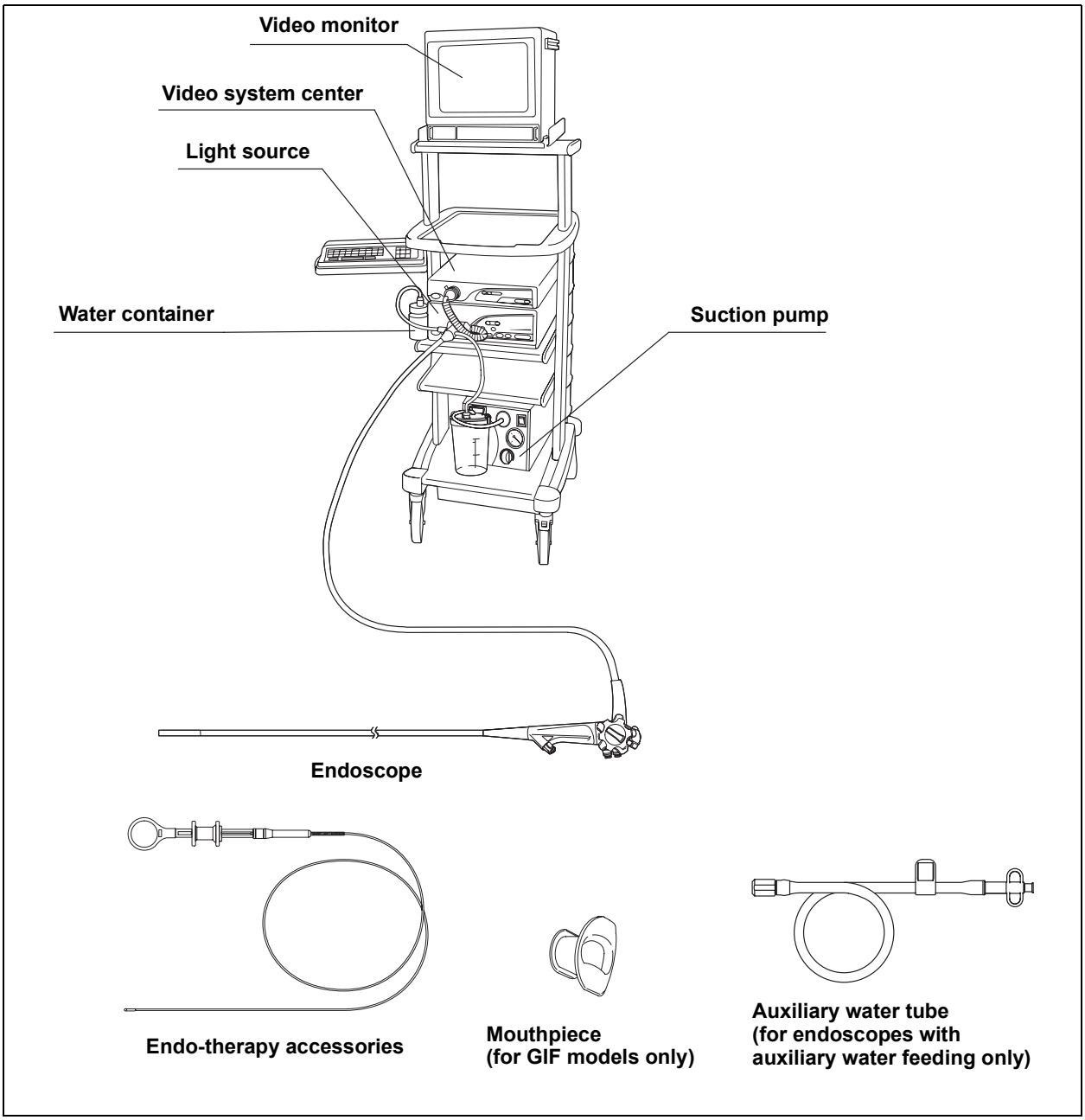
Before each case, prepare and inspect this instrument as instructed below. Inspect other equipment to be used with this instrument as instructed in their respective instruction manuals. Should the slightest irregularity be suspected, do not use this instrument and see Chapter 5, “Troubleshooting”.
If the irregularity is still suspected after consulting Chapter 5, contact Olympus. Damage or irregularity may compromise patient or user safety and may result in more severe equipment damage.

WARNING

- Using an endoscope that is not functioning properly may compromise patient or operator safety and may result in more severe equipment damage.
- This instrument was not cleaned, disinfected or sterilized before shipment. Before using this instrument for the first time, reprocess it according to the instructions given in the endoscope’s companion manual, the “REPROCESSING MANUAL” whose cover lists the model of your endoscope.

3.1 Preparation of the equipment

Prepare the equipment shown in Figure 3.1 (for compatibility, see the “System chart” in the Appendix) and personal protective equipment, such as eye wear, face mask, moisture-resistant clothing and chemical-resistant gloves, before each use. Refer to the respective instruction manuals for each piece of equipment.



• Paper towels	• Trays	• Lint-free cloths	• Personal protective equipment

Figure 3.1

3.2 Inspection of the endoscope

Clean and disinfect or sterilize the endoscope as described in its companion reprocessing manual. Then remove the water-resistant cap from the endoscope connector.

Inspection of the endoscope

1. Inspect the control section and the endoscope connector for excessive scratching, deformation, loose parts or other irregularities.
2. Inspect the boot and the insertion tube near the boot for bends, twists or other irregularities.
3. Inspect the external surface of the entire insertion tube including the bending section and the distal end for dents, bulges, swelling, scratching, holes, sagging, transformation, bends, adhesion of foreign bodies, dropout of parts, any protruding objects or other irregularities.
4. Holding the insertion tube gently with one hand, carefully run your fingertips over the entire length of the insertion tube in both directions (see Figure 3.2). Confirm that no objects or metallic wire protrude from the insertion tube. Also confirm that the insertion tube is not abnormally rigid.

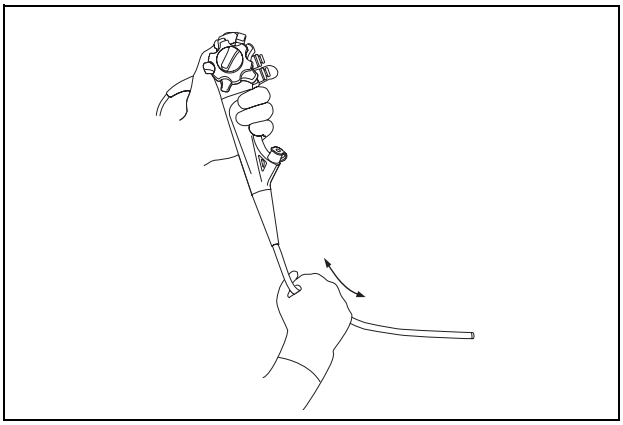


Figure 3.2

5. Using both hands, bend the insertion tube of the endoscope into a semicircle. Then, moving your hands as shown by the arrows in Figure 3.3, confirm that the entire insertion tube can be smoothly bent to form a semicircle and that the insertion tube is pliable. When inspecting endoscopes with flexibility adjustment, perform the test with the insertion tube at both its most-flexible and most-rigid settings (for endoscopes with flexibility adjustment only).

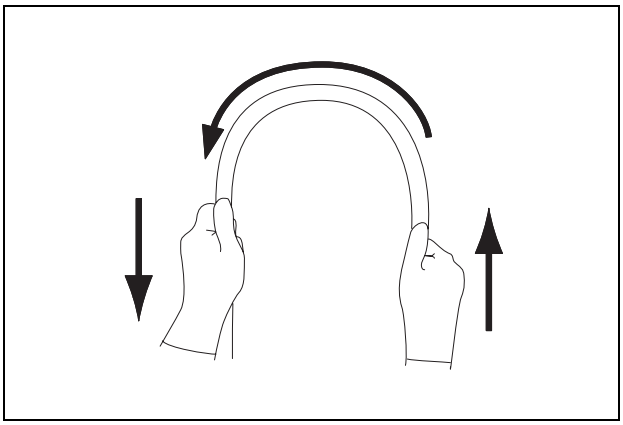


Figure 3.3

6. Gently hold the midpoint of the bending section and a point 20 cm from the distal end. Push and pull gently to confirm that the border between the bending section and the insertion tube is not loose.

7. Inspect the objective lens at the distal end of the endoscope's insertion tube for scratching, cracks, stains or other irregularities.

8. Inspect the air/water nozzle at the distal end of the endoscope's insertion tube for dents, bulges, swelling or other irregularities.

Inspection of the flexibility adjustment mechanism (for CF-Q160AL/I, PCF-160AL/I only)

1. Confirm that the index markings ("●", "1", "2", "3") on the flexibility adjustment ring and the " ▮ " mark at the bottom of the grip section are clearly visible (see Figure 3.4).

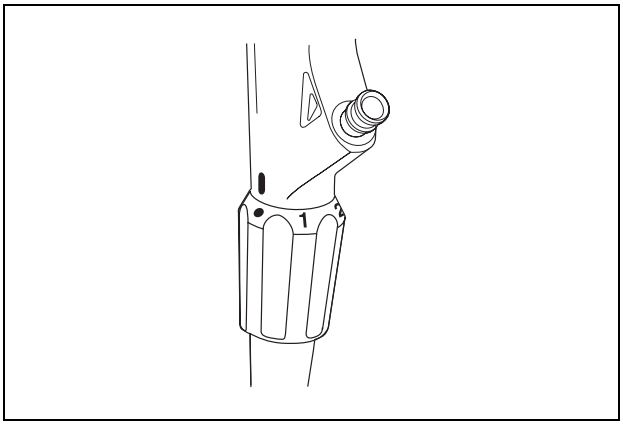


Figure 3.4

WARNING

Do not use the endoscope if the markings are not clearly visible. If the operator is uncertain of the flexibility of the endoscope, insertion and manipulation of the endoscope may cause patient pain and/or injury.

2. Confirm that the flexibility adjustment ring can be turned smoothly when the insertion tube is straight.

NOTE

If the insertion tube is coiled with a small diameter, the flexibility adjustment ring may not operate smoothly. This does not indicate a malfunction.

3. Set the insertion tube to the softest and stiffest conditions, respectively. In each case, hold the insertion tube with two hands between 30 and 50 cm from the distal end, and bend it gently as shown in Figure 3.5. Confirm that the actual flexibility varies according to the flexibility adjustment settings.

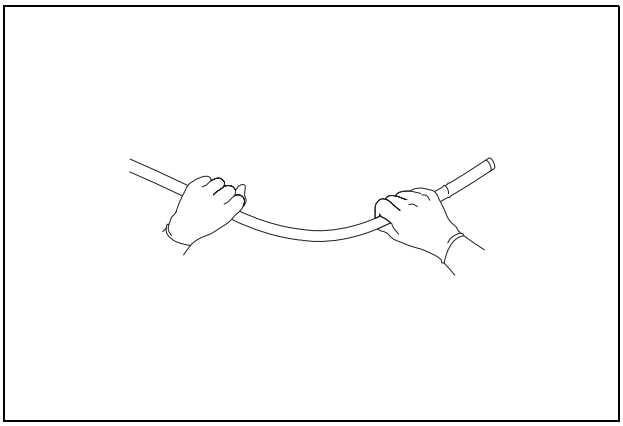


Figure 3.5

Inspection of the bending mechanisms

Perform the following inspections while the bending section is straight.

WARNING

If the movement of the UP/DOWN angulation lock, RIGHT/LEFT angulation lock and their angulation control knobs are loose and/or not smooth, or the bending section does not angulate smoothly, the bending mechanism may be abnormal. In this case, do not use the endoscope because it may be impossible to straighten the bending section during an examination.

❍ Inspection for smooth operation

1. Confirm that both the UP/DOWN and RIGHT/LEFT angulation locks move all the way in the "F▶" direction.
2. Turn the UP/DOWN and RIGHT/LEFT angulation control knobs slowly in each direction until they stop. Confirm that the bending section angulates smoothly and correctly and that maximum angulation can be achieved.
3. Turn the UP/DOWN and RIGHT/LEFT angulation control knobs slowly to their respective neutral positions as shown in Figure 3.6. Confirm that the bending section returns smoothly to an approximately straight condition.

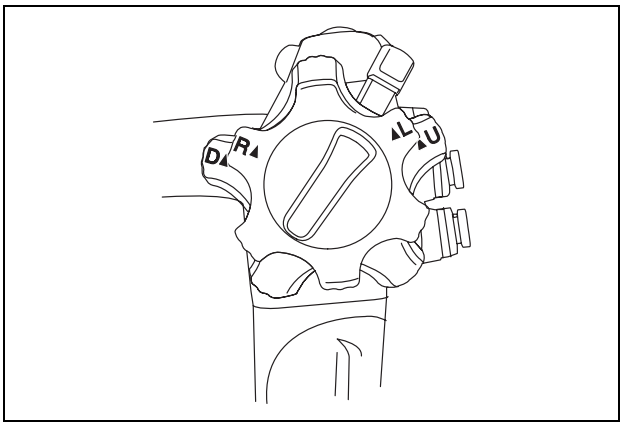


Figure 3.6

❍ Inspection of the UP/DOWN angulation mechanism

1. Move the UP/DOWN angulation lock all the way in the opposite direction of the “F▶” mark. Then turn the UP/DOWN angulation control knob in the “▲U” or the “D▲” direction until it stops.
2. Confirm that the angle of the bending section is roughly stabilized when the UP/DOWN angulation control knob is released.
3. Confirm that the bending section straightens out automatically when the UP/DOWN angulation lock is moved all the way in the “F▶” direction and the UP/DOWN angulation control knob is released.

❍ Inspection of the RIGHT/LEFT angulation mechanism

1. Turn the RIGHT/LEFT angulation lock all the way in the opposite direction of the “F▶” mark. Then turn the RIGHT/LEFT angulation control knob in the “R▲” or the “▲L” direction until it stops.
2. Confirm that the angle of the bending section is roughly stabilized when the RIGHT/LEFT angulation control knob is released.
3. Confirm that the bending section straightens out automatically when the RIGHT/LEFT angulation lock is turned in the “F▶” direction and the RIGHT/LEFT angulation control knob is released.

3.3 Preparation and inspection of accessories

Clean and disinfect or sterilize the air/water valve, suction valve, biopsy valve and auxiliary water tube (for endoscopes with auxiliary water feeding only) as described in the endoscope's companion reprocessing manual.

Inspection of the air/water and suction valves

1. Confirm that the holes of the valves are not blocked (see Figures 3.7 and 3.8).
2. Confirm that the valves are not deformed or cracked (see Figures 3.7 and 3.8).
3. Check for excessive scratching or tears in the air/water valve's seals (see Figures 3.7 and 3.8).

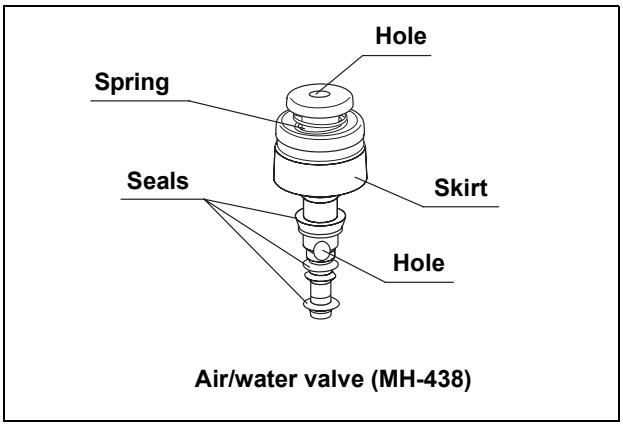


Figure 3.7

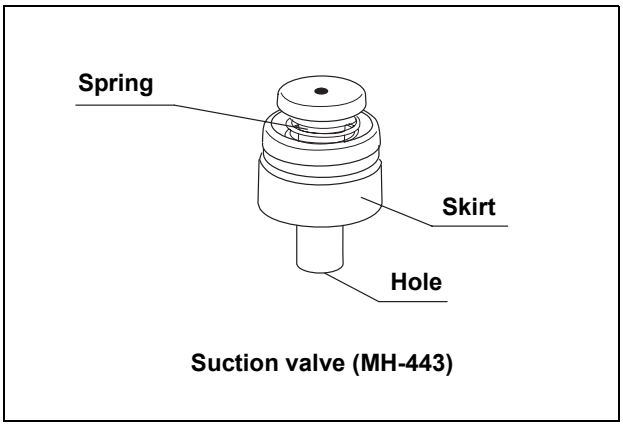


Figure 3.8

CAUTION

- The air/water and suction valves are consumables. If the inspection of the air/water or suction valve reveals any irregularities, use new valves.
- Only air/water valve MH-438 and suction valve MH-443 should be used with this endoscope.

Inspection of the biopsy valve

WARNING

The biopsy valve is a consumable item that should be inspected before each use. Replace it with a new one if irregularities are observed by following inspection. An irregular, abnormal or damaged valve can reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.

1. Confirm that the slit and hole on the biopsy valves have no splits, cracks, deformation, discoloration or other damage (see Figure 3.9).

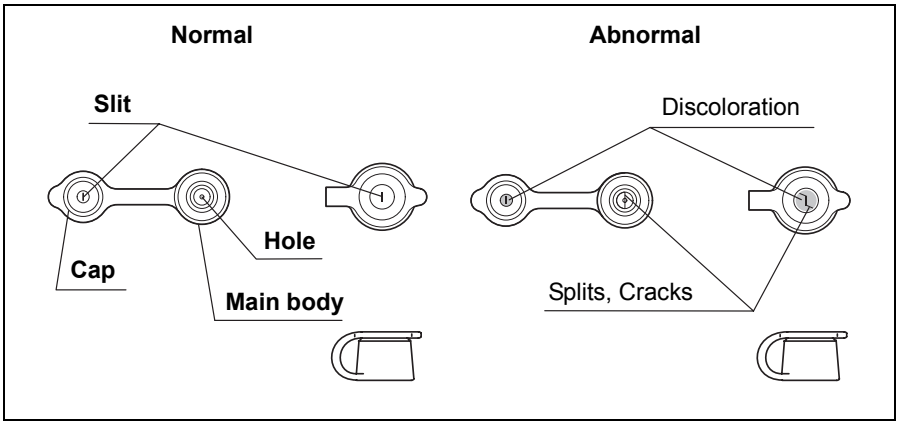


Figure 3.9

2. Attach the cap to the main body (see Figure 3.10).

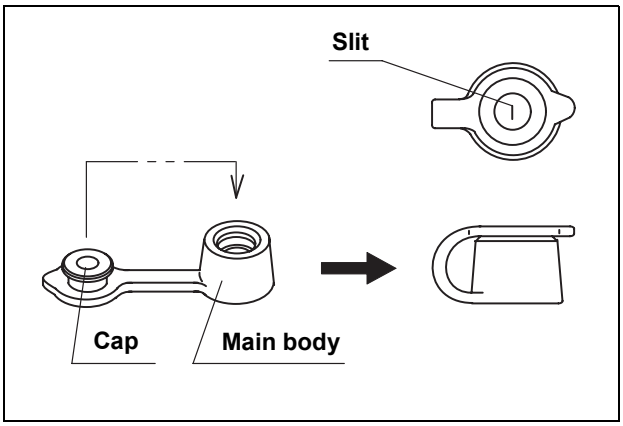


Figure 3.10

Inspection of the auxiliary water inlet cap (for endoscopes with auxiliary water feeding only)

Inspect the auxiliary water inlet cap for dents, cracks or other irregularities.

Inspection of the auxiliary water tube (for endoscopes with auxiliary water feeding only)

Inspect the auxiliary water tube for cracks, scratches, flaws and other damage (see Figure 3.11).

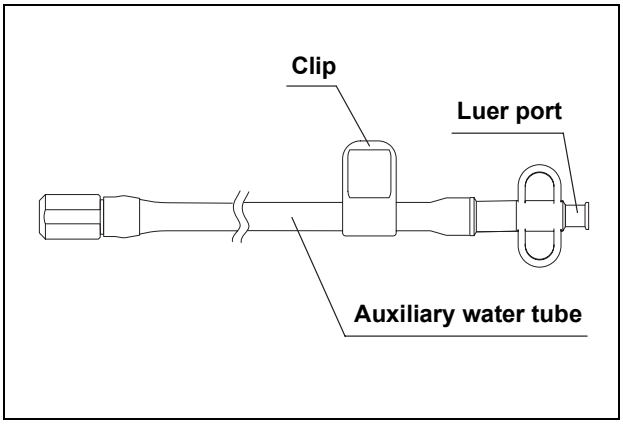


Figure 3.11

Inspection of the mouthpiece (for GIF models only)

CAUTION

Do not use a mouthpiece that is damaged, deformed or reveals other irregularities. Doing so may cause patient injury and/or equipment damage.

NOTE

Placing the mouthpiece in the patient's mouth before the procedure prevents the patient from biting and/or damaging the endoscope's insertion tube.

1. Confirm that the mouthpiece is free from cracks, deformation or discoloration (see Figure 3.12).

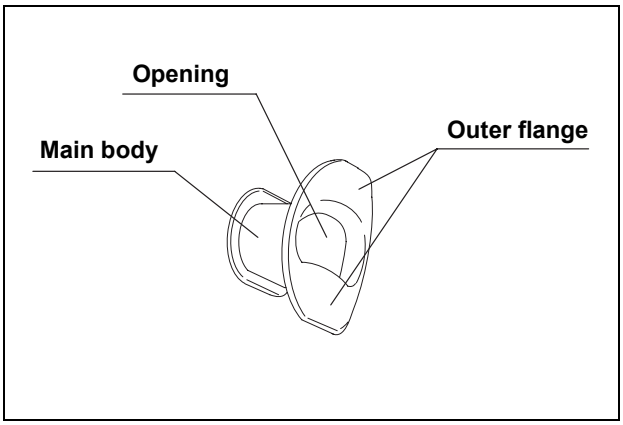


Figure 3.12

2. Using your fingers, check for excessive scratching or other irregularities on all surfaces of the mouthpiece (see Figure 3.12).

3.4 Attaching accessories to the endoscope

CAUTION

The air/water valve and the suction valve do not require lubrication. Lubricants can cause swelling of the valves' seals, which will impair valve function.

Attaching the suction valve

1. Align the two metal ridges on the underside of the suction valve with the two holes in the suction cylinder.
2. Attach the suction valve to the suction cylinder of the endoscope (see Figures 3.13 and 3.14). Confirm that the valve fits properly without any bulging of the skirt.

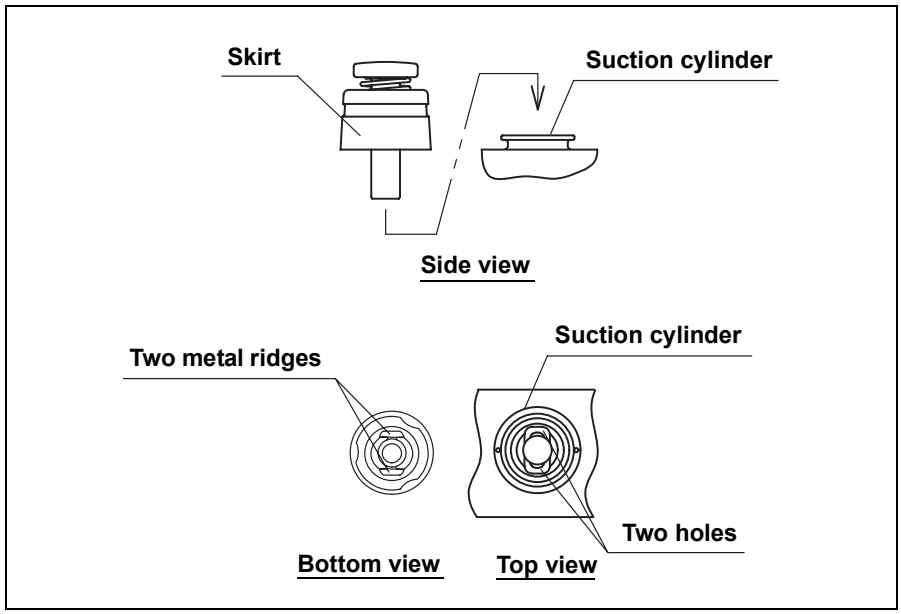


Figure 3.13

NOTE

The suction valve will make a whistling noise when it is dry; this does not indicate a malfunction.

Attaching the air/water valve

Attach the air/water valve to the air/water cylinder of the endoscope (see Figure 3.14). Confirm that the valve fits properly without any bulging of the skirt.

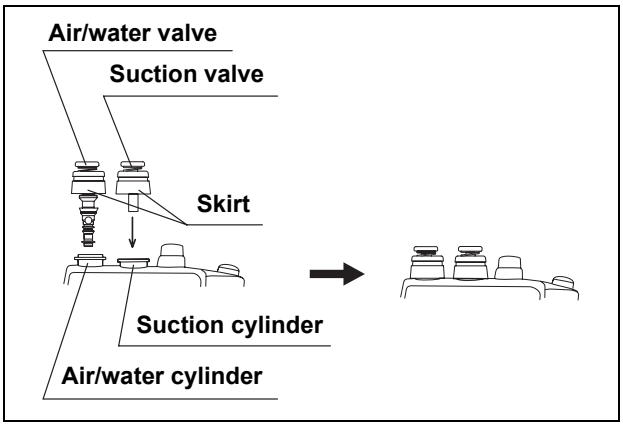


Figure 3.14

NOTE

The air/water valve may stick at first, but it should operate smoothly after it is depressed a few times.

Attaching the biopsy valve

WARNING

If a biopsy valve is not properly connected to the instrument channel port, it can reduce the efficacy of the endoscope's suction system and may cause patient debris to leak or spray from the endoscope.

Attach the biopsy valve to the instrument channel port of the endoscope (see Figure 3.15). Confirm that the biopsy valve fits properly.

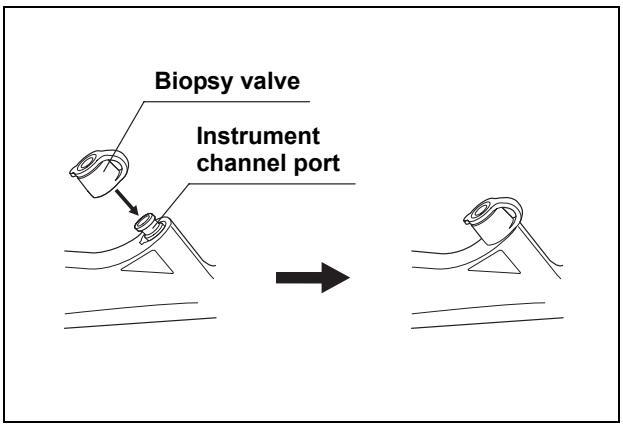


Figure 3.15

3.5 Inspection and connection of ancillary equipment

Inspection of ancillary equipment

CAUTION

- Attach the water container to the specified receptacle on the trolley or the light source. If the water container is attached anywhere else, water may drip from the water container's water supply tube, and equipment malfunction can result.
- Take care not to spill water from the water container's connection adapter when detaching the connection adapter from the endoscope. Spilled water could splash on the equipment, and may cause equipment malfunction.

Prepare and inspect the light source, video system center, video monitor, water container, suction pump and endo-therapy accessories as described in their respective instruction manuals.

Connection of the endoscope and ancillary equipment

WARNING

Firmly connect the suction tube from the suction pump to the suction connector on the endoscope connector. If the suction tube is not attached properly, debris may drip from the tube and can present an infection control risk, cause equipment damage and/or reduce performance.

NOTE

When using the GIF-XP160, use the videoscope cable EXERA (MAJ-843). This endoscope is not compatible with the videoscope cable 100 (MH-976).

1. If any ancillary equipment is ON, turn it OFF.
2. Insert the endoscope connector completely into the output socket of the light source.

3. Connect the water container's connection adapter to the air supply connector and water supply connector (see Figure 3.16).

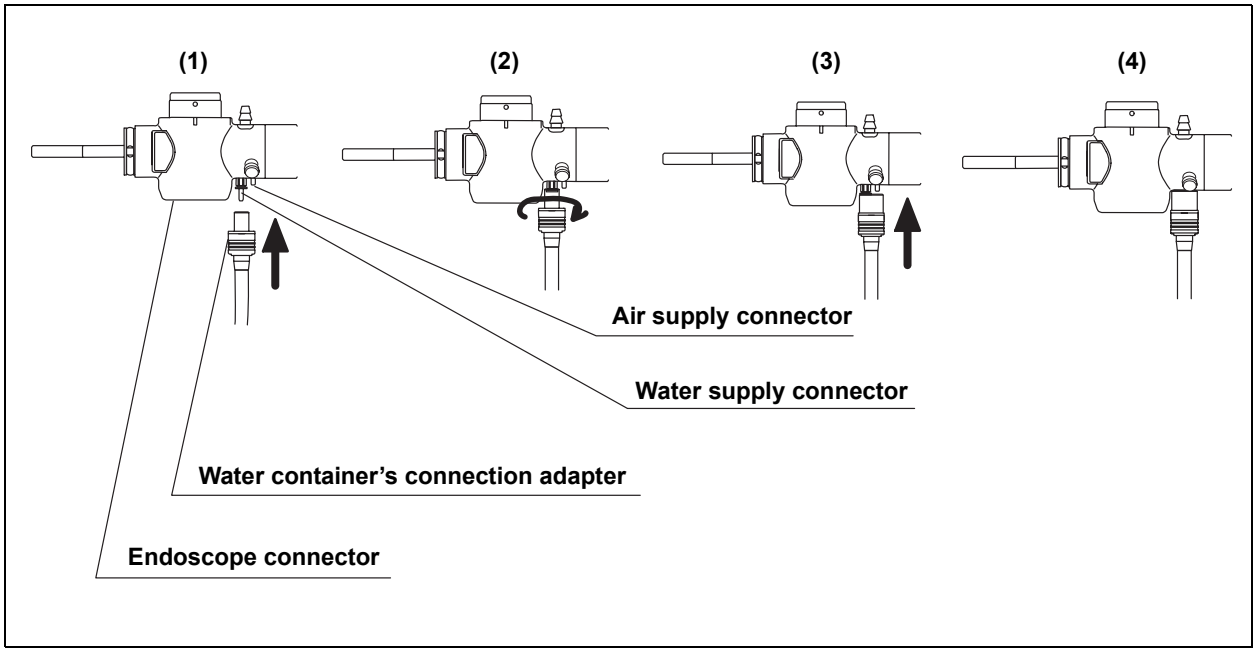


Figure 3.16

4. Align the mark on the videoscope cable EXERA or the videoscope cable 100 with mark 1 on the endoscope connector and push it in until it stops (see Figure 3.17).

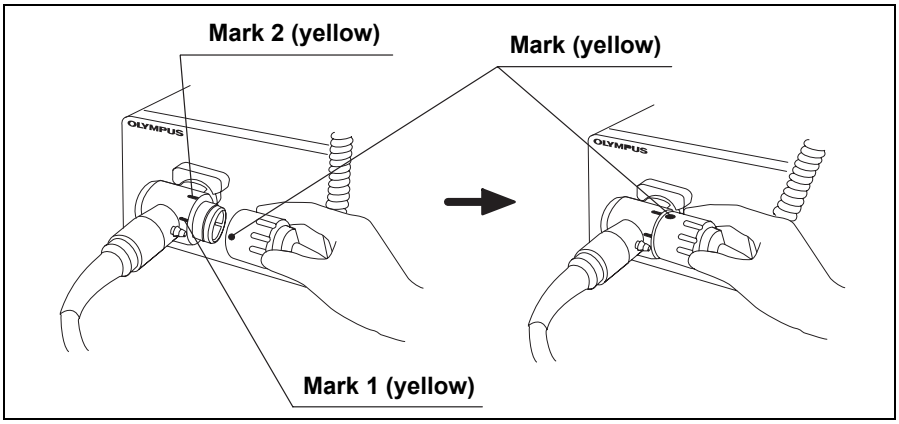


Figure 3.17

5. Turn the connector of the videoscope cable clockwise until it stops (see Figure 3.17).

6. Confirm that the mark on the videoscope cable is aligned with mark 2 on the endoscope connector.

7. Connect the suction tube from the suction pump to the suction connector on the endoscope connector (see Figure 3.18).

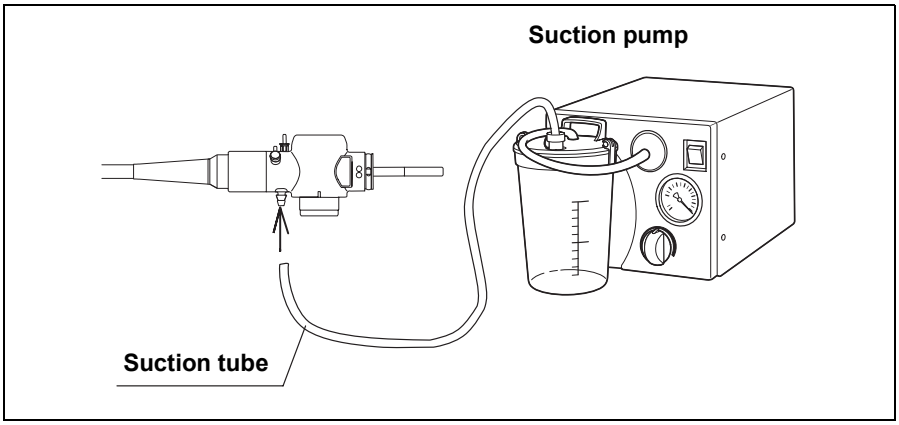


Figure 3.18

8. Open the auxiliary water inlet cap
(for endoscopes with auxiliary water feeding only, see Figure 3.19).

9. Connect the auxiliary water tube to the auxiliary water inlet on the endoscope connector and turn it clockwise until it stops
(for endoscopes with auxiliary water feeding only, see Figure 3.19).

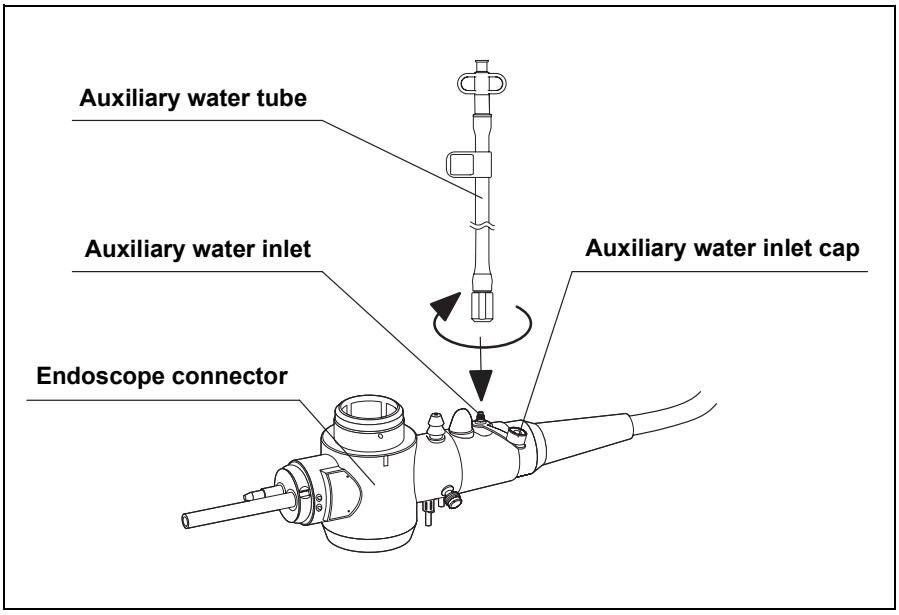


Figure 3.19

3.6 Inspection of the endoscopic system

Inspection of the endoscopic image

Turn ON the video system center, light source and video monitor and inspect the endoscopic image as described in their respective instruction manuals.

NOTE

If the object cannot be seen clearly, wipe the objective lens using a clean, lint-free cloth moistened with 70% ethyl or isopropyl alcohol.

Inspection of remote switch

WARNING

All remote control switches should be checked to work normally even when they are not expected for use. The endoscopic image may freeze or other irregularities may occur during examination and may cause patient injury, bleeding and/or perforation.

Depress every remote control switch and confirm that the specified functions work normally.

Inspection of the air feeding function

1. Set the airflow regulator on the light source to “High”, as described in the light source’s instruction manual.
2. Immerse the distal end of the insertion tube in sterile water to a depth of 10 cm and confirm that no air bubbles are emitted when the air/water valve is not operated.
3. Cover the hole in the air/water valve with your finger and confirm that air bubbles are continuously emitted from the air/water nozzle.
4. Uncover the hole in the air/water valve and confirm that no air bubbles are emitted from the air/water nozzle.

WARNING

If a stream of air bubbles is emitted from the air/water nozzle even though the air/water valve is not being operated and the distal end of the insertion tube is 10 cm or more below the surface of the sterile water, an irregularity in the air feeding function may be suspected. If the endoscope is used while air is continuously being fed, over-insufflation and patient injury may result.
If air bubbles are emitted from the air/water nozzle, remove and reattach the air/water valve correctly, or replace it with another one. If this fails to stop air bubbles from being emitted, do not use the endoscope, as there may be a malfunction. Contact Olympus.

NOTE

When the distal end of the insertion tube is immersed less than 10 cm below the surface of the sterile water, a small amount of air bubbles may be emitted from the air/water nozzle even when the air/water valve is not operated. This does not indicate a malfunction.

Inspection of the objective lens cleaning function

WARNING

Use sterile water only. Using non-sterile water may cause patient cross-contamination and infection.

1. Keep the air/water valve's hole covered with your finger and depress the valve. Observe the endoscopic image and confirm that water flows on the entire objective lens.
2. Release the air/water valve. Observe the endoscopic image and confirm that the emission of water stops and that the valve returns smoothly to its original position.
3. While observing the endoscopic image, feed air after feeding water by covering the hole in the air/water valve with your finger. Confirm that the emitted air removes the remaining water on the objective lens and clears the endoscopic image.

NOTE

- When the air/water valve is depressed for the first time, it may take a few seconds before water is emitted.
- If the air/water valve returns to its original position slowly after water feeding, remove the air/water valve and moisten the seals with sterile water.
- During the inspection, place the distal end of the endoscope in a beaker or other container so that the floor does not get wet.

Inspection of the suction function

WARNING

- If the suction valve does not operate smoothly, detach it and reattach it, or replace it with a new one. If the endoscope is used while the suction valve is not working properly, it may be impossible to stop suction, which could cause patient injury. If the reattached or replaced suction valve fails to operate smoothly, the endoscope may be malfunctioning; stop using it and contact Olympus.
- If the biopsy valve leaks, replace it with a new one. A leaking biopsy valve can reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.

1. Place the container of sterile water and the endoscope on the same height. For the inspection, adjust the suction pressure to the same level as it will be during the procedure.
2. Immerse the distal end of the insertion tube in sterile water with the endoscope's instrument channel port at the same height as the water level in the water container. Press the suction valve and confirm that water is continuously aspirated into the suction bottle of the suction pump.
3. Release the suction valve. Confirm that suction stops and the valve returns to its original position.
4. Depress the suction valve and aspirate water for one second. Then, release the suction valve for one second. Repeat this several times and confirm that no water leaks from the biopsy valve.
5. Remove the distal end of the endoscope from the water. Depress the suction valve and aspirate air for a few seconds to remove any water from the instrument channel.

Inspection of the instrument channel

WARNING

Keep your eyes away from the distal end when inserting endo-therapy accessories. Extending the endo-therapy accessory from the distal end could cause eye injury.

1. Insert the endo-therapy accessory through the biopsy valve. Confirm that the endo-therapy accessory extends smoothly from the distal end.
2. Confirm that the endo-therapy accessory is withdrawn smoothly from the biopsy valve.

Inspection of the auxiliary water feeding function (for endoscopes with auxiliary water feeding only)

WARNING

- Use sterile water only. Using non-sterile water may cause patient cross-contamination and infection.
- Note that the luer port on the MAJ-855 includes a one-way valve to prevent backflow – do not use the MAJ-855 without this connector in place, otherwise backflow of contaminated material may occur and equipment damage or patient injury may result.

1. Attach a syringe containing sterile water or the water tube from a water pump to the luer port of the auxiliary water tube (see Figure 3.20). Feed water and confirm that water is emitted from the auxiliary water channel at the distal end of the insertion tube.
2. Make sure that no water leaks at the connection between the connecting end of the auxiliary water tube and the auxiliary water inlet.
3. Make sure that no water leaks at the connection between the luer port of the auxiliary water tube and the syringe or the water tube.
4. Disconnect the water tube from the water pump or the syringe from the luer port of the auxiliary water tube. Make sure that no water leaks from the luer port of the auxiliary water tube and/or the distal end of the insertion tube.

CAUTION

If the auxiliary water channel is used for feeding water, never disconnect the auxiliary water tube during an examination; leave it attached until the endoscope is precleaned. If the auxiliary water tube is detached before precleaning, water remaining in the auxiliary water channel may be spilled on the surrounding equipment. This could cause damage to and/or malfunction of the equipment.

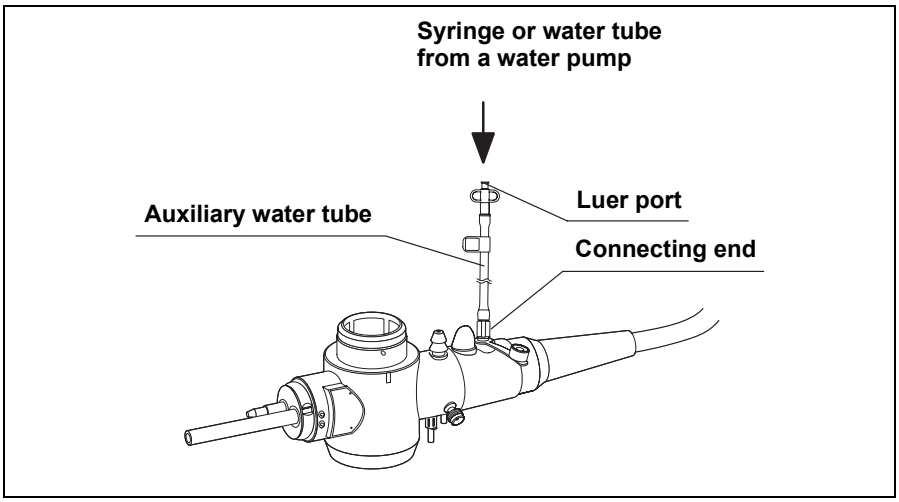


Figure 3.20

Chapter 4 Operation

The operator of this instrument must be a physician or medical personnel under the supervision of a physician and must have received sufficient training in clinical endoscopic technique. This manual, therefore, does not explain or discuss clinical endoscopic procedures. It only describes basic operation and precautions related to the operation of this instrument.

WARNING

- Wear personal protective equipment to guard against dangerous chemicals and potentially infectious material during operation. During operation, wear appropriate personal protective equipment, such as eye wear, face mask, moisture-resistant clothing, and chemical-resistant gloves that fit properly and are long enough so that your skin is not exposed.
- The temperature of the distal end of the endoscope may exceed 41°C (106°F) and reach 50°C (122°F) due to intense endoscopic illumination. Surface temperatures over 41°C (106°F) may cause mucosal burns. Always use the minimum level of illumination, minimum time and suitable distance necessary for adequate viewing. Whenever possible, avoid close stationary viewing and do not leave the distal end of the endoscope close to the mucous membrane for a long time.
- Whenever possible, do not leave the endoscope illuminated before and/or after an examination. Continued illumination will cause the distal end of the endoscope to become hot and could cause operator and/or patient burns.
- Turn the video system center ON to operate the light source's automatic brightness function. When the video system center is OFF, it cannot operate the light source's automatic brightness function, and the light intensity is set to the maximum level. In this case, the distal end of the endoscope can become hot and could cause operator and/or patient burns.

- Never insert or withdraw the endoscope under any of the following conditions. Otherwise, patient injury can result.
  - Insertion or withdrawal while the endo-therapy accessory extends from the distal end of the endoscope.
  - Insertion or withdrawal while the bending section is locked in position.
  - Insertion or withdrawal with excessive force, or forcible insertion or withdrawal.
- If any of the following phenomena occur during an examination, immediately stop the examination and withdraw the endoscope from the patient as described in Section 5.2, “Withdrawal of the endoscope with an abnormality”.
  - If any abnormality is suspected with the functionality of the endoscope.
  - If the endoscopic image on the video monitor disappears or freezes unexpectedly.
  - If the angulation control mechanism is not functioning properly.
  - If the flexibility adjustment ring becomes jammed.

  Continued use of the endoscope under these conditions could result in patient injury.
- If an abnormal endoscopic image/function occurs and returns to its normal condition by itself, the endoscope has malfunctioned. In this case, stop using the endoscope because the abnormality can occur again and may not return to its normal condition. Therefore, stop the examination immediately and slowly withdraw the endoscope while viewing the endoscopic image. Otherwise, patient injury can result.
- Never insert or withdraw the endoscope’s insertion tube or perform flexibility adjustment while the endo-therapy accessory extends from the distal end of the endoscope. Patient injury can result.
- Regardless of the flexibility of the endoscope’s insertion tube, it can cause patient injury if it is forcibly inserted, withdrawn and/or twisted with excessive force. It is generally believed that an endoscope with a stiffer insertion tube can control the intestines more easily provided that it is used properly. However, it should be noted that such an endoscope, if used improperly, is more likely to cause patient pain and/or injury than an endoscope with a softer insertion tube.

- The flexibility of the insertion tube of the CF-Q160AL/I can be adjusted to less than, equal to or more than that of the CF-Q140L/I. The flexibility of the insertion tube of the PCF-160AL/I can be adjusted in equal to or more than that of the PCF-140L/I. The insertion tube of the endoscope should be adjusted to the appropriate flexibility for each case. Always confirm the flexibility of the insertion tube by holding the insertion tube with two hands before inserting it into the patient, and adjust the flexibility as necessary according to the case, region and patient's condition during an examination. If you are unsure of the appropriate flexibility of the insertion tube, set it to the softest condition. Continuing the examination while the insertion tube is set to an inappropriate degree of flexibility may cause patient pain and/or injury.

NOTE

Set the brightness of the light source to the minimum necessary to perform the procedure safely. If the endoscope is used for a prolonged period at or near maximum light intensity, vapor may be observed in the endoscopic image. This is caused by the evaporation of organic material (remaining blood, moisture in stool, etc.) due to heat generated by the light guide near the light guide lens. If this vapor continues to interfere with the examination, remove the endoscope, wipe the distal end of the endoscope with a lint-free cloth moistened with 70% ethyl or isopropyl alcohol, reinsert the endoscope and continue the examination.

4.1 Insertion

Holding and manipulating the endoscope

The control section of the endoscope is designed to be held in the left hand. The air/water and suction valves can be operated using the left index finger. The UP/DOWN angulation control knob can be operated using the left thumb. The right hand is free to manipulate the insertion tube and the RIGHT/LEFT angulation control knob (see Figure 4.1).

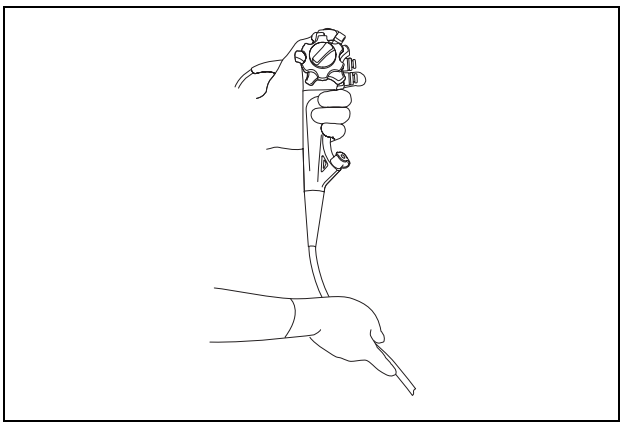


Figure 4.1

Insertion of the endoscope

CAUTION

- To prevent the patient from accidentally biting the insertion tube during an examination, it is strongly recommended that a mouthpiece be placed in the patient's mouth before inserting the endoscope (for GIF models only).
- Do not apply olive oil or products containing petroleum-based lubricants (e.g. vaseline). These products may cause stretching and deterioration of the bending section's covering.
- Do not allow the insertion tube to be bent within a distance of 10 cm or less from the junction of the boot. Insertion tube damage can occur (see Figure 4.2).

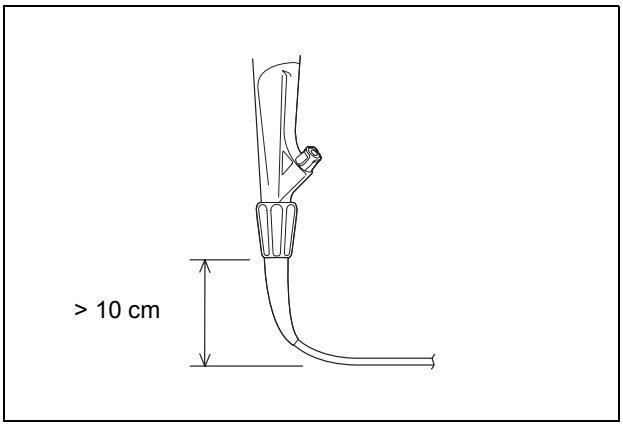


Figure 4.2

1. If necessary, apply a medical-grade, water-soluble lubricant to the insertion tube.
2. Place the mouthpiece between the patient's teeth or gums, with the outer flange on the outside of the patient's mouth (for GIF models only).
3. Insert the insertion tube of the endoscope into the splinting tube if required, and apply the lubricant to it (for CF/PCF models only).
4. Insert the distal end of the endoscope through the opening of the mouthpiece, then from the mouth to the pharynx, while viewing the endoscopic image. Do not insert the insertion tube into the mouth beyond the insertion tube limit mark (for GIF models only).
5. Always view the endoscopic image when passing the distal end of the endoscope from the anus to the rectum. Do not insert the insertion tube into the anus beyond the insertion tube limit mark (for CF/PCF models only).

Angulation of the distal end

1. Operate the angulation control knobs as necessary to guide the distal end for insertion and observation.
2. The endoscope's angulation locks are used to hold the angulated distal end in position.

NOTE

- When passing an endo-therapy accessory through the instrument channel while the angulation is locked, the angle of the distal end may change. When it is necessary to keep the angulation stationary, hold the angulation control knobs in place with your hand.
- When operating the UP/DOWN or RIGHT/LEFT angulation lock, hold the angulation control knob stationary with your finger. If this is not done, the angulation will change.

Flexibility adjustment (for CF-Q160AL/I, PCF-160AL/I only)

WARNING

- Do not change the insertion tube's flexibility rapidly. Otherwise, patient pain and/or injury can result.
- If the endoscopic image moves suddenly or is lost, while you are changing the insertion tube's flexibility, stop changing the insertion tube's flexibility, and restore the optimum field of view. Changing the flexibility without a clear endoscopic image may cause patient pain and/or injury.
- If the patient complains of pain, while you are changing the insertion tube's flexibility, stop changing the insertion tube's flexibility, and ensure the safety of the patient.
- If the flexibility of the insertion tube must be made stiffer during an examination, confirm that there are no loops or excessive bends in the insertion tube (using fluoroscopy, if necessary) before increasing its stiffness. If the force required to turn the flexibility adjustment ring is greater during the procedure than it was when inspecting the endoscope, it may mean that the insertion tube is excessively bent inside the patient. In this case, straighten the insertion tube as much as possible before attempting to increase the stiffness. Failure to do so may cause patient pain and/or injury.

1. Before inserting or withdrawing the endoscope, set the insertion tube to an appropriate level of flexibility by turning the flexibility adjustment ring as required (see Figure 4.3).

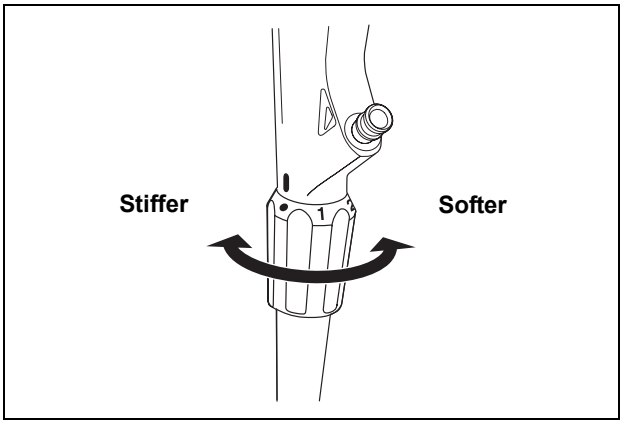


Figure 4.3

2. When changing the insertion tube's flexibility during a procedure, turn the flexibility adjustment ring slowly, and closely monitor the position of flexibility index marking, the endoscopic image and the patient's condition.

CAUTION

Whenever the endoscope is not in use, set the insertion tube to its softest condition. Otherwise, endoscope damage may result.

Air/water feeding and suction

WARNING

- Before using a syringe to inject liquid through the biopsy valve, detach the valve's cap from the main body. Then insert the syringe straight into the valve and inject the liquid. If the cap is not detached and/or the syringe is not inserted straight, the biopsy valve could be damaged, which could reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.
- If the biopsy valve is left uncapped during the procedure, debris or fluids could leak or spray from it, posing an infection control risk. When the valve is uncapped, place a piece of sterile gauze over it to prevent leakage.

Air/water feeding

WARNING

If the sterile water level in the water container is too low, then air, not water, will be supplied. In this case, turn OFF the airflow regulator on the light source and add more sterile water to the water container.

1. Cover the air/water valve's hole to feed air from the air/water nozzle at the distal end (see Figure 4.4).
2. Depress the air/water valve to feed water onto the objective lens (see Figure 4.4).

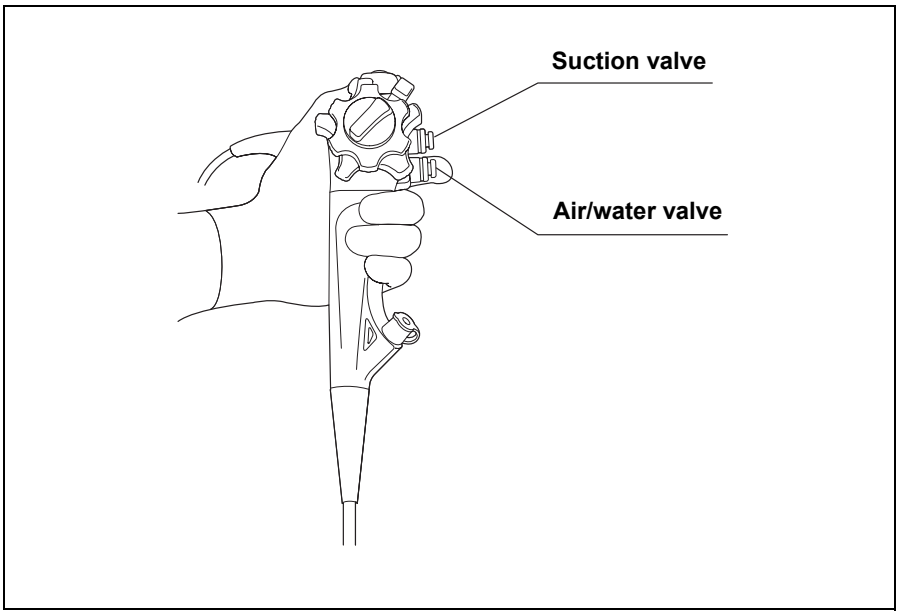


Figure 4.4

Suction

WARNING

- Avoid aspirating solid matter or thick fluids; channel or valve clogging can occur. If the suction valve clogs and suction cannot be stopped, disconnect the suction tube from the suction connector on the endoscope connector. Turn the suction pump OFF, detach the suction valve and remove solid matter or thick fluids.

- When aspirating, maintain the suction pressure at the lowest level necessary to perform the procedure. Excessive suction pressure could cause aspiration of and/or injury to the mucous membrane. In addition, patient fluids could leak or spray from the biopsy valve, posing an infection-control risk.
- When aspirating, attach the cap to the main body of the biopsy valve. The uncapped biopsy valve can reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.

CAUTION

During the procedure, take notice that the suction bottle does not fill completely. Aspirating fluids into a full bottle may cause the suction pump to malfunction.

Depress the suction valve to aspirate excess fluid or other debris obscuring the endoscopic image (see Figure 4.4).

NOTE

Performing both air feeding and suction at the same time sometimes makes it easier to remove water droplets from the objective lens surface.

❍ Auxiliary water feeding (for endoscopes with auxiliary water feeding only)

WARNING

Use sterile water only. Using non-sterile water may cause patient cross-contamination and infection.

CAUTION

- Never disconnect the auxiliary water tube from the auxiliary water inlet during an examination; leave it attached until the endoscope is precleaned. If the auxiliary water tube is detached before precleaning, water remaining in the auxiliary water channel may be spilled on the equipment. This could cause damage and/or malfunction of the equipment.
- When the auxiliary water tube is not connected to the auxiliary water inlet, be sure to have the auxiliary water inlet cap attached to the auxiliary water inlet. Otherwise, patient debris etc. that back flowed may drip out of the auxiliary water inlet.

1. Attach a syringe containing sterile water or the water tube from a water pump to the luer port of the auxiliary water tube. Feed water.

2. When disconnecting the syringe or the water tube from the water pump during examination, disconnect it directly from the luer port but leave the auxiliary water tube itself attached.

Observation of the endoscopic image

Refer to the light source's instruction manual for instructions on how to adjust the brightness.

4.2 Using endo-therapy accessories

For more information on combining the endoscope with particular endo-therapy accessories, refer to the "System chart" in the Appendix and the instruction manuals of the accessories. Refer to the instruction manuals of the accessories for instructions on how to operate the accessories.

WARNING

- When using endo-therapy accessories, keep the distance between the distal end of the endoscope and the mucous membrane greater than the endoscope's minimum visible distance so that the endo-therapy accessory remains visible in the endoscopic image. If the distal end of the endoscope is placed closer than its own minimum visible distance, the position of the accessory cannot be seen in the endoscopic image, which could cause serious injury and/or equipment damage. The minimum visible distance depends on the type of endoscope being used. Refer to Section 2.3, "Specifications".
- When inserting or withdrawing an endo-therapy accessory, confirm that its distal end is closed or completely retracted into the sheath. Slowly insert or withdraw the endo-therapy accessory straight into/from the slit of the biopsy valve. Otherwise, the biopsy valve may be damaged and pieces of it could fall off.
- If the insertion or withdrawal of endo-therapy accessories is difficult, straighten the bending section as much as possible without losing the endoscopic image. Inserting or withdrawing endo-therapy accessories with excessive force may damage the instrument channel or endo-therapy accessories cause some parts to fall off and/or cause patient injury.

- If the distal end of an endo-therapy accessory is not visible in the endoscopic image, do not open the distal end or extend the needle of the instrument. This could cause patient injury, bleeding, perforation and/or equipment damage.

CAUTION

- When using a biopsy forceps with a needle, confirm that the needle is not bent excessively. A bent needle could protrude from the closed cups of the biopsy forceps. Using such a biopsy forceps could damage the instrument channel and/or cause patient injury.
- When using an injector, be sure not to extend or retract the needle from the catheter of the injector until the injector is extended from the distal end of the endoscope. The needle could damage the instrument channel if extended inside the channel, or if the injector is inserted or withdrawn while the needle is extended.

Insertion of endo-therapy accessories into the endoscope

WARNING

- Do not insert endo-therapy accessories forcibly or abruptly. Otherwise, the endo-therapy accessory may extend from the distal end of the endoscope abruptly, which could cause patient injury, bleeding and/or perforation.
- When using the endo-therapy accessory with the cap of the biopsy valve detached, it is easier to insert the accessory. But, as a result, it can reduce efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection control risk. When not using the endo-therapy accessory, attach the cap to the main body of the biopsy valve.
- When the cap of the biopsy valve is detached, it may cause patient debris or fluids to leak or spray from the endoscope, posing an infection control risk. When the valve is uncapped, place a piece of sterile gauze over it to prevent leakage.
- Do not let the endo-therapy accessory 'hang down' from the biopsy valve. Doing so can create a space between the accessory and the valve's slit or hole and/or damage the valve, which can reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.

- Hold the part which is close to the biopsy valve of the endo-therapy accessory, and insert it straight, slowly, and little by little to the biopsy valve. Otherwise, the endo-therapy accessory and/or biopsy valve could be damaged. This can reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.

1. Select endo-therapy accessories compatible with the instrument from the "System chart" in the Appendix. Also refer to the instruction manuals of the endo-therapy accessories.
2. Hold the UP/DOWN and RIGHT/LEFT angulation knobs stationary.
3. Confirm that the tip of the endo-therapy accessory is closed or retracted into its sheath and insert the endo-therapy accessory slowly and straight into the slit of the biopsy valve.

CAUTION

- Do not open the tip of the endo-therapy accessory or extend the tip of the endo-therapy accessory from its sheath in the instrument channel. The instrument channel and/or the endo-therapy accessory may become damaged.
- Hold the endo-therapy accessory close to the biopsy valve and insert it straight into the biopsy valve using slow, short strokes. Otherwise, the endo-therapy accessory could bend or break.

4. Hold the endo-therapy accessory approximately 4 cm from the biopsy valve and advance it slowly and straight into the biopsy valve using short strokes while observing the endoscopic image.

NOTE

When the tip of the endo-therapy accessory extends approximately 1 cm from the distal end of the endoscope, the accessory appears in the endoscopic image.

Operation of endo-therapy accessories

Operate the endo-therapy accessory according to the directions given in its instruction manual.

Withdrawal of endo-therapy accessories

WARNING

- Do not withdraw the endo-therapy accessory if the tip is open or extended from its sheath; patient injury and/or instrument damage may occur.
- Withdraw the endo-therapy accessory slowly and straight out of the biopsy valve. Otherwise, the valve's slit and/or hole could be damaged. This can reduce the efficacy of the endoscope's suction system, and may leak or spray patient debris or fluids, posing an infection-control risk.
- If the endo-therapy accessory cannot be withdrawn from the endoscope, close the endo-therapy accessory and/or retract it into its sheath, carefully withdraw both the endoscope and the endo-therapy accessory together under endoscopic observation. Take care not to cause tissue trauma.

Withdraw the endo-therapy accessory slowly while the tip of the endo-therapy accessory is closed and/or retracted into its sheath.

Use of non-flammable gases (for CF/PCF models only)

WARNING

Performing treatment while the intestines are filled with a flammable gas could result in an explosion, fire and/or serious patient injury. If the intestines contain a flammable gas, replace it with air or a non-flammable gas such as CO_2 before performing high-frequency or laser cauterization.

NOTE

Using CO_2 during endoscopic examinations of the colon and rectum, etc. may reduce post-examination pain.

When a non-flammable gas is used, only water containers MH-970 or MAJ-902 may be used with the endoscope. Carefully follow their instruction manuals.

High frequency cauterization

WARNING

- If the intestines contain a flammable gas, replace it with air or a non-flammable gas such as CO_2 before performing high frequency cauterization. Otherwise, fire or explosion could result.

- Not all parts of the endoscope are electrically insulated. When applying high frequency current, there is a danger of unintentional diathermy burns. Always wear electrically insulating chemical-resistant gloves.
- To avoid patient injury and/or damage to the endoscope, never emit high frequency current before confirming that the electrode section of the high frequency endo-therapy accessory is extended from the distal end of the endoscope in the endoscopic image. Also confirm that the electrode section of the electrosurgical accessory and the mucous membrane in the vicinity of the target area are at an appropriate distance from the distal end of the endoscope.

Prepare, inspect and connect the electrosurgical unit and electrosurgical accessories as described in their instruction manuals.

NOTE

The application of high frequency current may interfere with the endoscopic image. This is normal and does not indicate a malfunction.

Laser cauterization

WARNING

- Performing treatment while the intestines are filled with a flammable gas could result in an explosion, fire and/or serious patient injury. If the intestines contain a flammable gas, replace it with air or a non-flammable gas such as CO_2 before performing laser cauterization.
- To avoid patient injury and/or damage to the endoscope, do not start laser radiation before confirming that the tip of the laser probe appears in the proper position in the endoscopic image. Keep an appropriate distance between the target and the endoscope's distal end and always use the lowest power output possible.

CAUTION

- Before inserting or withdrawing the laser probe, return the UP/DOWN and RIGHT/LEFT angulation control knobs to their neutral positions (see Figure 3.6) so that the bending section will be straight. If it is bent, the instrument channel and/or the laser probe may be damaged.

- Allow the tip of the laser probe to cool down before pulling it in the channel. If the laser probe is withdrawn while hot, channel damage may occur.
- Do not use a damaged laser probe. A laser probe with a damaged sheath or distal end may cause patient injury and/or equipment damage.

Prepare, inspect and connect the laser unit and laser probe as described in their instruction manuals.

4.3 Withdrawal of the endoscope

WARNING

If the endoscope cannot be withdrawn from the patient smoothly, do not attempt to forcibly withdraw it; leave it inside the patient and immediately contact Olympus. Forcibly withdrawing the endoscope may cause patient injury.

1. Aspirate accumulated air, blood, mucus or other debris by depressing the suction valve.
2. Turn the UP/DOWN and RIGHT/LEFT angulation locks to the "F▶" direction to release them.
3. Carefully withdraw the endoscope while observing the endoscopic image.
4. When the splinting tube is used, withdraw it from the patient's anus (for CF/PCF models only).
5. Remove the mouthpiece from the patient's mouth (for GIF models only).

4.4 Transportation of the endoscope

Transporting within the hospital

1. Set the insertion tube to the softest condition (for CF-Q160AL/I, PCF-160AL/I only).
2. When carrying the endoscope with the auxiliary water tube connected to the auxiliary water inlet, attach the clip of the auxiliary water tube to the universal cord (for endoscopes with the auxiliary water feeding only, see Figure 4.5).

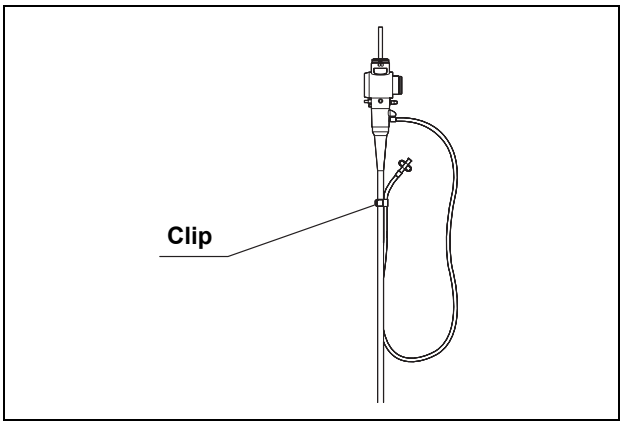


Figure 4.5

3. When carrying the endoscope by hand, loop the universal cord, hold the endoscope connector together with the control section in one hand and hold the distal end of the insertion tube securely, but gently without squeezing, in the other hand (see Figure 4.6).

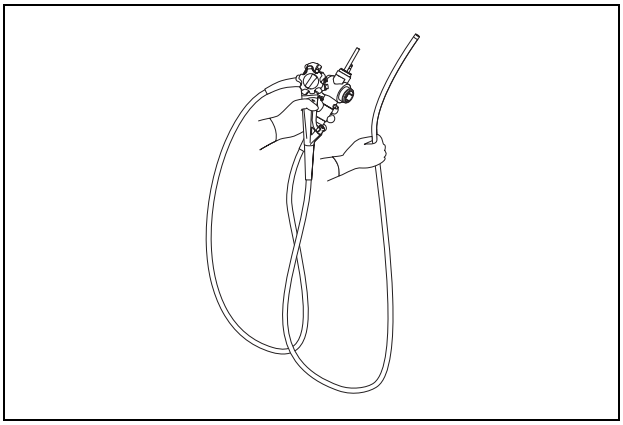


Figure 4.6

Transporting outside the hospital

Transport the endoscope in the carrying case.

WARNING

Always clean, disinfect or sterilize the endoscope after removing it from the carrying case.

CAUTION

- The carrying case cannot be cleaned, disinfected or sterilized. Clean and disinfect or sterilize the endoscope before placing it in the carrying case.
- Do not attach the water-resistant cap when transporting the endoscope, to avoid damage to the endoscope caused by changes in air pressure.
- Before putting the endoscope in the carrying case, always make sure that the insertion tube is set to the softest condition. Putting the endoscope in the carrying case while the insertion tube is stiff could damage the endoscope (for CF-Q160AL/I, PCF-160AL/I only).

Chapter 5 Troubleshooting

If the endoscope is visibly damaged, does not function as expected or is found to have irregularities during the inspection described in Chapter 3, “Preparation and Inspection”, do not use the endoscope. Contact Olympus.
Some problems that appear to be malfunctions may be correctable by referring to Section 5.1, “Troubleshooting guide”. If the problem cannot be resolved by the described remedial action, stop using the endoscope and send it to Olympus for repair.
Olympus does not repair accessory parts. If an accessory part becomes damaged, contact Olympus to purchase a replacement.

WARNING

- Never use the endoscope on a patient if an abnormality is suspected. Damage or irregularity in the instrument may compromise patient or user safety and may result in more severe equipment damage.
- If any parts of the endoscope fall off inside the patient body due to equipment damage or failure, stop using the endoscope immediately and retrieve the parts in an appropriate way.

If any abnormality in the function of the endoscope and/or endoscopic image is suspected during use, stop the examination immediately and carefully withdraw the endoscope from the patient as described in Section 5.2, “Withdrawal of the endoscope with an abnormality”.

5.1 Troubleshooting guide

The following table shows the possible causes of and countermeasures against troubles that may occur due to equipment setting errors or deterioration of consumables.
Troubles or failures due to other causes than those listed below should be serviced. As repair performed by persons who are not qualified by Olympus could cause patient or user injury and/or equipment damage, be sure to contact Olympus for repair.

Endoscope functions

❍ Angulation

Irregularity description	Possible cause	Solution
Resistance is encountered when rotating angulation control knob(s).	The angulation lock(s) is (are) engaged.	Rotate angulation lock(s) in the "F ▶" direction.

❍ Air/water feeding

Irregularity description	Possible cause	Solution
No air feeding.	The air pump is not operating.	Press the LOW, MED or HIGH button on the light source as described in the light source's instruction manual.
	The air/water valve is damaged.	Replace it with a new one.
No water feeding.	The air pump is not operating.	Press the LOW, MED or HIGH button on the light source as described in the light source's instruction manual.
	There is no sterile water in the water container.	Fill 2/3 with sterile water.
	The air/water valve is damaged.	Replace it with a new one.
The air/water valve is sticky.	The air/water valve is dirty.	Remove the air/water valve. Reprocess the air/water valve and then attach it again.
	The air/water valve is damaged.	Replace it with a new one.
The air/water valve cannot be attached.	An incorrect air/water valve is used.	Use a correct air/water valve.
	The air/water valve is damaged.	Replace it with a new one.

❍ Suction

Irregularity description	Possible cause	Solution
The suction is absent or insufficient.	The biopsy valve is not attached properly.	Attach it correctly.
	The biopsy valve is damaged.	Replace it with a new one.
	The suction pump is not set properly.	Adjust the suction pump's setting as described in its instruction manual.
	The suction valve is damaged.	Replace it with a new one.
The suction valve is sticky.	The suction valve is dirty.	Remove the suction valve. Reprocess the suction valve and attach it again.
	The suction valve is damaged.	Replace it with a new one.
The suction valve cannot be attached.	The suction valve is damaged.	Replace it with a new one.
	An incorrect suction valve is used.	Use a correct suction valve.
Liquid leaks out from the biopsy valve.	The biopsy valve is damaged.	Replace it with a new one.
	The biopsy valve is not attached properly.	Attach it correctly.

❍ Image quality or brightness

Irregularity description	Possible cause	Solution
There is no video image.	Not all power switches are ON.	Turn ON all the power switches.
An image is not clear.	The objective lens is dirty.	Feed water to remove mucus, etc.
An image is excessively dark or bright.	The light source is not set properly.	Adjust the light source's setting as described in its instruction manual.

❍ Flexibility adjustment (for CF-Q160AL/I, PCF-160AL/I only)

Irregularity description	Possible cause	Solution
Too difficult to turn the flexibility adjustment ring.	The insertion tube is looped.	Straighten the insertion tube.

❍ Auxiliary water feeding (for endoscopes with auxiliary water feeding only)

Irregularity description	Possible cause	Solution
The auxiliary water inlet cap is leaking.	The auxiliary water inlet cap is worn out.	Replace it with a new one.
	The auxiliary water inlet cap is incorrectly installed.	Install the auxiliary water inlet cap correctly.

❍ Endo-therapy accessories

Irregularity description	Possible cause	Solution
An endo-therapy accessory does not pass through the instrument channel smoothly.	An incompatible endo-therapy accessory is being used.	Refer to the “System chart” in the Appendix and select a compatible endo-therapy accessory.

❍ Others

Irregularity description	Possible cause	Solution
The remote switch does not work.	The wrong remote switch is operated.	Operate the correct remote switch.
	The remote switch function has been set improperly.	Set the remote switch function correctly as described in the video system center’s instruction manual.

5.2 Withdrawal of the endoscope with an abnormality

If an abnormality occurs while the endoscope is in use, take a proper measure as described in either “When the endoscopic image appears on the monitor” or “When the endoscopic image does not appear on the monitor or the frozen image cannot be restored” below. After withdrawal, return the endoscope for repair as described in Section 5.3, “Returning the endoscope for repair”.

WARNING

If the endoscope or endo-therapy accessory cannot be withdrawn from the patient smoothly, do not attempt to forcibly withdraw it. If any irregularities are suspected, immediately contact Olympus. Forcibly withdrawing the endoscope or endo-therapy accessory may cause patient injury, bleeding and/or perforation.

When the endoscopic image appears on the monitor

1. Turn OFF all equipment except the video system center, light source and monitor.
2. When using an endo-therapy accessory, withdraw the endo-therapy accessory slowly while the tip of the endo-therapy accessory is closed and/or retracted into its sheath.
3. Aspirate accumulated air, blood, mucus or other debris by depressing the suction valve.
4. When using an endoscope with the flexibility adjustment function, set the insertion tube to its softest condition (for CF-Q160AL/I, PCF-160AL/I only).
5. Turn the UP/DOWN and RIGHT/LEFT angulation locks to the “F▶” direction to release them.
6. Carefully withdraw the endoscope while observing the endoscopic image.
7. When the splinting tube is used, withdraw it from the patient’s anus (for CF models only).
8. Remove the mouthpiece from the patient’s mouth (for GIF models only).

When the endoscopic image does not appear on the monitor or the frozen image cannot be restored

1. Turn OFF all equipment except the video system center, the light source and the monitor.
2. Turn the video system center and light source OFF and then ON again. If the endoscopic image appears or the frozen image is restored, follow the procedure of Step 2. and below “When the endoscopic image appears on the monitor” on page 74.
   When the endoscopic image still does not appear or the frozen image cannot be restored, perform the following steps.
3. Turn OFF the video system center, the light source and the monitor.
4. When using an endo-therapy accessory, withdraw the endo-therapy accessory slowly while the tip of the endo-therapy accessory is closed and/or retracted into its sheath.
5. When using an endoscope with the flexibility adjustment function, set the insertion tube to the softest condition (for CF-Q160AL/I, PCF-160AL/I only).
6. Turn the UP/DOWN and RIGHT/LEFT angulation locks to the “F▶” direction to release them.
7. Turn the UP/DOWN and RIGHT/LEFT angulation control knobs to their respective neutral positions (see Figure 3.6). Release the angulation control knobs and carefully withdraw the endoscope.
8. When the splinting tube is used, withdraw it from the patient’s anus (for CF models only).
9. Remove the mouthpiece from the patient’s mouth (for GIF models only).

5.3 Returning the endoscope for repair

WARNING

Thoroughly clean and high-level disinfect or sterilize the endoscope before returning it for repair. Improperly reprocessed equipment presents an infection control risk to each person who handles the endoscope within the hospital or at Olympus.

CAUTION

Olympus is not liable for any injury or damage which occurs as a result of repairs attempted by non-Olympus personnel.

Before returning the endoscope for repair, contact Olympus. With the endoscope, include a description of the malfunction or damage and the name and telephone number of the individual at your location who is most familiar with the problem. Also include a repair purchase order.
When returning the endoscope for repair, follow the instructions given in “Transporting outside the hospital” on page 69.

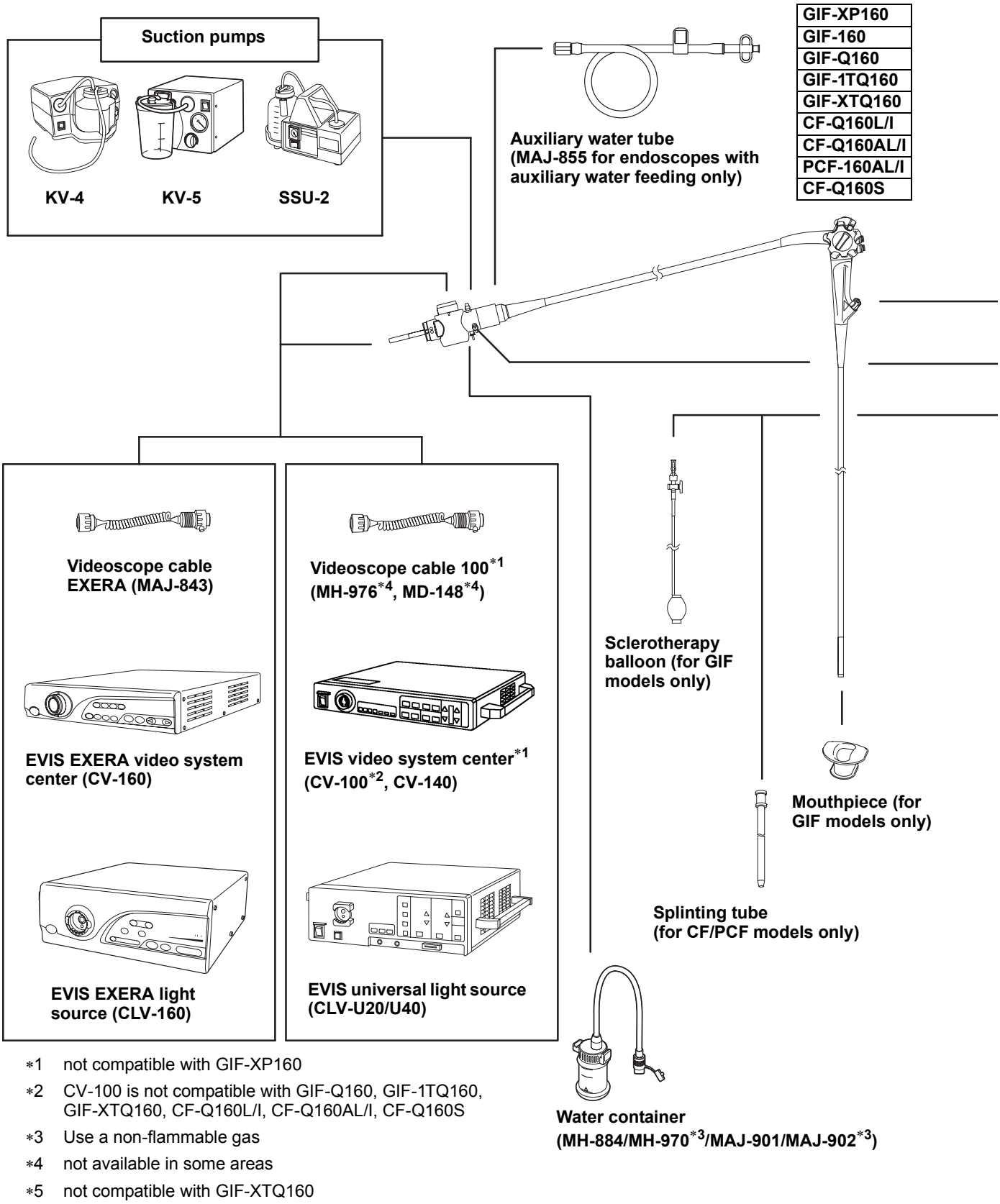
Appendix

System chart

The recommended combinations of equipment and accessories that can be used with this instrument are listed below. Some items may not be available in some areas. New products released after the introduction of this instrument may also be compatible for use in combination with this instrument. For further details, contact Olympus.

WARNING

If combinations of equipment other than those shown below are used, the full responsibility is assumed by the medical treatment facility.



∗1 not compatible with GIF-XP160

∗2 CV-100 is not compatible with GIF-Q160, GIF-1TQ160, GIF-XTQ160, CF-Q160L/I, CF-Q160AL/I, CF-Q160S

∗3 Use a non-flammable gas

∗4 not available in some areas

∗5 not compatible with GIF-XTQ160

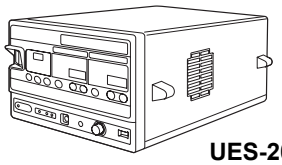
Forceps suction plug (T-Plug) (MH-405 for GIF-XTQ160 only)

Biopsy valve (MB-358)

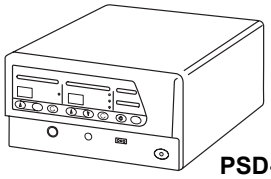
Endo-therapy accessories

See next page.

Electrosurgical units



UES-20/30



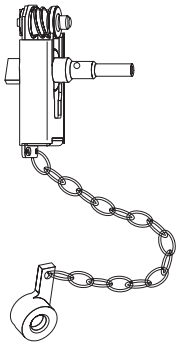
PSD-20/30

Electrosurgical accessories

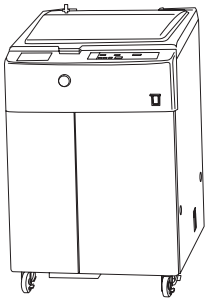
See next page.

Sclerotherapy tube (for GIF models only)

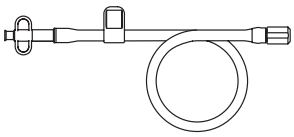
Cleaning and disinfection equipment



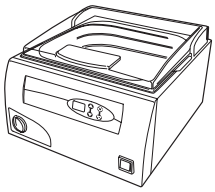
Channel plug (MH-944)



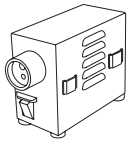
Endoscope washer (EW-30)[*4]
Endoscope reprocessor[*4] (OER/OER-A[*5])



Auxiliary water tube (MAJ-855 for endoscopes with auxiliary water feeding only)



Ultrasonic cleaner (KS-2/ENDOSONIC)

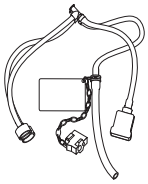


Maintenance unit (MU-1)

Channel cleaning brush (BW-20T)

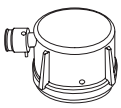
AW channel cleaning adapter (MH-948)

Leakage tester (MB-155)



Injection tube (MH-946)

Channel-opening cleaning brush (MH-507)



Water-resistant cap (MH-553)

Channel cleaning brush (BW-17K for GIF-XTQ160 only)

Suction cleaning adapter (MH-856)

❍ EVIS EXERA video system center/EVIS video system centers

Endoscope	Videoscope cable 100		Videoscope cable EXERA
	CV-100	CV-140	CV-160
GIF-XP160	–	–	○
GIF-160	○	○	○
GIF-Q160	–	○	○
GIF-1TQ160	–	○	○
GIF-XTQ160	–	○	○
CF-Q160L/I	–	○	○
CF-Q160AL/I	–	○	○
PCF-160AL/I	○	○	○
CF-Q160S	–	○	○

○ applicable – not applicable

❍ Accessories (for GIF models only)

Endoscope	Mouthpiece		Sclerotherapy balloon		Sclerotherapy tube	Forceps suction plug
	MB-142	MA-474	MD-689	MD-692	ST-E1	MH-405
GIF-XP160	○	○	–	–	○	–
GIF-160	○	–	○	–	○	–
GIF-Q160	○	–	–	○	○	–
GIF-1TQ160	○	–	–	○	○	–
GIF-XTQ160	○	–	–	–	–	○

○ applicable – not applicable

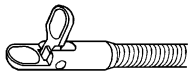
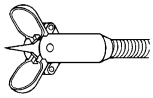
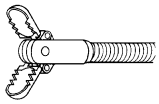
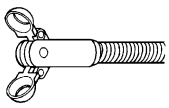
❍ Accessories (for CF/PCF models only)

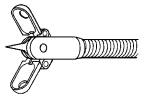
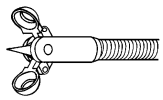
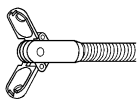
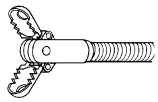
Endoscope	Splinting tube			
	ST-C3	ST-C3S	ST-C5	ST-C8*1
CF-Q160L/I	○	○	–	○
CF-Q160AL/I	○	○	–	○
PCF-160AL/I	–	–	○	–
CF-Q160S	–	–	–	–

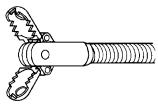
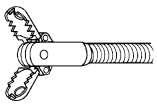
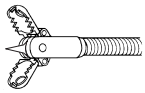
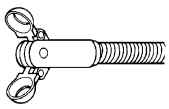
○ applicable – not applicable

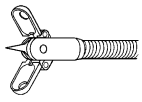
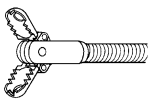
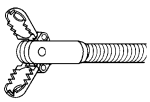
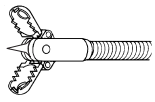
*1 This accessory may not be available in some areas.

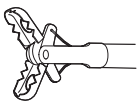
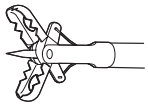
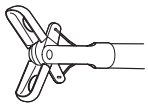
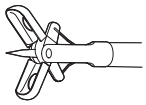
❍ Endo-therapy accessories

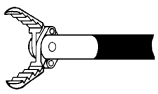
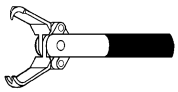
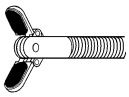
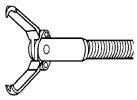
Endoscope	BIOPSY FORCEPS			BIOPSY FORCEPS (Fenestrated)
	Single side open	With needle	Alligator jaws	Standard
				
GIF-XP160	–	–	FB-15K-1	FB-19K-1/21K-1
GIF-160	FB-11K-1	–	–	FB-25K-1
GIF-Q160	FB-11K-1	–	–	FB-25K-1
GIF-1TQ160	FB-11K-1	FB-13K-1	FB-15K-1	FB-25K-1
GIF-XTQ160	FB-11K-1	FB-13K-1	FB-15K-1	FB-25K-1
CF-Q160L	FB-7U-1	FB-13U-1	–	FB-28U-1
CF-Q160I	FB-7U-1	FB-13Q-1	–	FB-28R-1
CF-Q160AL	FB-7U-1	FB-13U-1	–	FB-28U-1
CF-Q160AI	FB-7U-1	FB-13Q-1	–	FB-28R-1
PCF-160AL	FB-7U-1	–	–	FB-28U-1
PCF-160AI	FB-7U-1	–	–	FB-28R-1
CF-Q160S	FB-11K-1	FB-13E-1	–	FB-25K-1

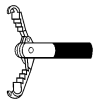
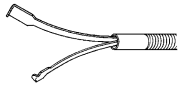
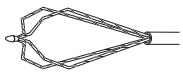
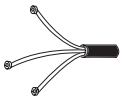
Endoscope	BIOPSY FORCEPS (Fenestrated)			
	Elongated cups with needle	With needle	Rat tooth	Alligator jaws
				
GIF-XP160	–	FB-34K-1	–	–
GIF-160	FB-24K-1	FB-23K-1	FB-37K-1	FB-36K-1
GIF-Q160	FB-24K-1	FB-23K-1	FB-37K-1	FB-36K-1
GIF-1TQ160	FB-24K-1	FB-50K-1	FB-37K-1	FB-36K-1
GIF-XTQ160	FB-24K-1	FB-51K-1	FB-37K-1	FB-36K-1
CF-Q160L	FB-24U-1	FB-50U-1	FB-37U-1	–
CF-Q160I	FB-24Q-1	FB-50Q-1	FB-37U-1	–
CF-Q160AL	FB-24U-1	FB-50U-1	FB-37U-1	–
CF-Q160AI	FB-24Q-1	FB-50Q-1	FB-37U-1	–
PCF-160AL	FB-24U-1	–	FB-37U-1	–
PCF-160AI	FB-24Q-1	–	FB-37U-1	–
CF-Q160S	FB-24E-1	FB-50K-1	FB-37K-1	FB-36K-1

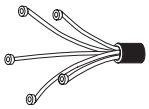
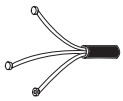
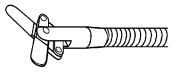
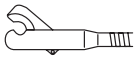
Endoscope	BIOPSY FORCEPS (Fenestrated)			ROTATABLE BIOPSY FORCEPS (Fenestrated)
	Alligator jaws and rat tooth (Swinging type)	Alligator jaws and rat tooth (Swinging type/ Elongated cups)	Alligator jaws and rat tooth with needle (Swinging type/ Elongated cups)	Standard type
				
GIF-XP160	–	FB-52K-1	–	FB-19KR-1
GIF-160	FB-53K-1	FB-54K-1	FB-55K-1	FB-25KR-1
GIF-Q160	FB-53K-1	FB-54K-1	FB-55K-1	FB-25KR-1
GIF-1TQ160	FB-53K-1	FB-54K-1	FB-55K-1	FB-25KR-1
GIF-XTQ160	FB-53K-1	FB-54K-1	FB-55K-1	FB-25KR-1
CF-Q160L	FB-53U-1	FB-54U-1	FB-55U-1	–
CF-Q160I	FB-53Q-1	FB-54Q-1	FB-55Q-1	–
CF-Q160AL	FB-53U-1	FB-54U-1	FB-55U-1	–
CF-Q160AI	FB-53Q-1	FB-54Q-1	FB-55Q-1	–
PCF-160AL	FB-53U-1	FB-54U-1	FB-55U-1	–
PCF-160AI	FB-53Q-1	FB-54Q-1	FB-55Q-1	–
CF-Q160S	FB-53K-1	FB-54K-1	FB-55K-1	FB-25KR-1

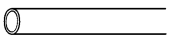
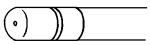
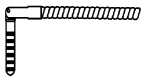
Endoscope	ROTATABLE BIOPSY FORCEPS (Fenestrated)			
	Elongated cups with needle	Alligator jaws and rat tooth (Swinging type)	Alligator jaws and rat tooth (Swinging type/ Elongated cups)	Alligator jaws and rat tooth with needle (Swinging type/ Elongated cups)
				
GIF-XP160	–	–	–	–
GIF-160	FB-24KR-1	FB-53KR-1	FB-54KR-1	FB-55KR-1
GIF-Q160	FB-24KR-1	FB-53KR-1	FB-54KR-1	FB-55KR-1
GIF-1TQ160	FB-24KR-1	FB-53KR-1	FB-54KR-1	FB-55KR-1
GIF-XTQ160	FB-24KR-1	FB-53KR-1	FB-54KR-1	FB-55KR-1
CF-Q160L	–	–	–	–
CF-Q160I	–	–	–	–
CF-Q160AL	–	–	–	–
CF-Q160AI	–	–	–	–
PCF-160AL	–	–	–	–
PCF-160AI	–	–	–	–
CF-Q160S	FB-24KR-1	FB-53KR-1	FB-54KR-1	FB-55KR-1

Endoscope	DISPOSABLE BIOPSY FORCEPS			
	Alligator jaws-step	**Alligator jaws-step with needle**	**Oval**	**Oval with needle**
				
GIF-XP160	**FB-211K**	**FB-221K**	**FB-231K**	**FB-241K**
GIF-160	**FB-210K**	**FB-220K**	**FB-230K**	**FB-240K**
GIF-Q160	**FB-210K**	**FB-220K**	**FB-230K**	**FB-240K**
GIF-1TQ160	**FB-212U**	**FB-222U**	**FB-232U**	**FB-242U**
GIF-XTQ160	**FB-212U**	**FB-222U**	**FB-232U**	**FB-242U**
CF-Q160L	**FB-212U**	**FB-222U**	**FB-232U**	**FB-242U**
CF-Q160I	**FB-212U**	**FB-222U**	**FB-232U**	**FB-242U**
CF-Q160AL	**FB-212U**	**FB-222U**	**FB-232U**	**FB-242U**
CF-Q160AI	**FB-212U**	**FB-222U**	**FB-232U**	**FB-242U**
PCF-160AL	**FB-210U**	**FB-220U**	**FB-230U**	**FB-240U**
PCF-160AI	**FB-210U**	**FB-220U**	**FB-230U**	**FB-240U**
CF-Q160S	**FB-210K**	**FB-220K**	**FB-230K**	**FB-240K**

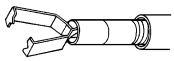
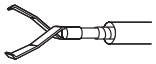
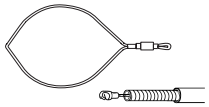
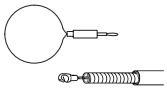
Endoscope	GRASPING FORCEPS			
	Alligator jaws	Rat tooth	Covered tips	Sharp tooth
				
GIF-XP160	**–**	**FG-14P-1**	**FG-20P-1**	**–**
GIF-160	**FG-6L-1**	**FG-8L-1/48L-1/ 50L-1**	**FG-21L-1**	**FG-32L-1**
GIF-Q160	**FG-6L-1**	**FG-8L-1/48L-1/ 50L-1**	**FG-21L-1**	**FG-32L-1**
GIF-1TQ160	**FG-7L-1**	**FG-9L-1/48L-1/ 50L-1**	**FG-21L-1**	**FG-32L-1**
GIF-XTQ160	**FG-7L-1**	**FG-9L-1/48L-1/ 50L-1**	**FG-21L-1**	**FG-32L-1**
CF-Q160L	**FG-7U-1**	**FG-9U-1**	**–**	**–**
CF-Q160I	**FG-7U-1**	**FG-9U-1**	**–**	**–**
CF-Q160AL	**FG-7U-1**	**FG-9U-1**	**–**	**–**
CF-Q160AI	**FG-7U-1**	**FG-9U-1**	**–**	**–**
PCF-160AL	**FG-6U-1**	**FG-8U-1**	**–**	**–**
PCF-160AI	**FG-6U-1**	**FG-8U-1**	**–**	**–**
CF-Q160S	**FG-7L-1**	**FG-9L-1/48L-1/ 50L-1**	**FG-21L-1**	**FG-32L-1**

Endoscope	GRASPING FORCEPS			
	Rat tooth with alligator jaws	W shape jaw	Basket type	Tripod type
				
GIF-XP160	–	FG-4L-1	FG-17K-1	–
GIF-160	FG-42L-1/47L-1/ 49L-1	FG-4L-1	FG-16L-1	FG-45L-1
GIF-Q160	FG-42L-1/47L-1/ 49L-1	FG-4L-1	FG-16L-1	FG-45L-1
GIF-1TQ160	FG-42L-1/47L-1/ 49L-1	FG-4L-1	FG-16L-1	FG-45L-1
GIF-XTQ160	FG-42L-1/47L-1/ 49L-1	FG-4L-1	FG-16L-1	FG-45L-1
CF-Q160L	–	–	FG-16U-1	FG-45U-1
CF-Q160I	–	–	FG-16U-1	FG-45U-1
CF-Q160AL	–	–	FG-16U-1	FG-45U-1
CF-Q160AI	–	–	FG-16U-1	FG-45U-1
PCF-160AL	–	–	FG-16U-1	FG-45U-1
PCF-160AI	–	–	FG-16U-1	FG-45U-1
CF-Q160S	FG-42L-1/47L-1/ 49L-1	FG-4L-1	FG-16L-1	FG-45L-1

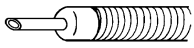
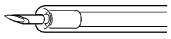
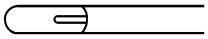
Endoscope	GRASPING FORCEPS	SINGLE USE GRASPING FORCEPS	SURGICAL SCISSORS	LOOP CUTTER
	Pentapod type	Tripod type		
				
GIF-XP160	–	–	–	–
GIF-160	FG-46L-1	FG-600U	FS-3L-1	FS-5L-1
GIF-Q160	FG-46L-1	FG-600U	FS-3L-1	FS-5L-1
GIF-1TQ160	FG-46L-1	FG-600U	FS-3L-1	FS-5L-1
GIF-XTQ160	FG-46L-1	FG-600U	FS-3L-1	FS-5L-1
CF-Q160L	FG-46U-1	FG-600U	–	FS-5U-1
CF-Q160I	FG-46U-1	FG-600U	–	FS-5Q-1
CF-Q160AL	FG-46U-1	FG-600U	–	FS-5U-1
CF-Q160AI	FG-46U-1	FG-600U	–	FS-5Q-1
PCF-160AL	FG-46U-1	FG-600U	–	FS-5U-1
PCF-160AI	FG-46U-1	FG-600U	–	FS-5Q-1
CF-Q160S	FG-46L-1	FG-600U	FS-3L-1	FS-5L-1

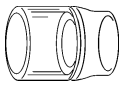
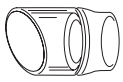
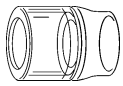
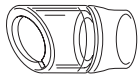
Endoscope	WASHING PIPE		MEASURING DEVICE	
	Standard type	Spray type	Straight type	Bendable type
				
GIF-XP160	PW-2L-1	PW-6P-1	M1-2K*1	M2-4K*1
GIF-160	PW-1L-1	PW-5L-1	M1-2K*1	M2-4K*1
GIF-Q160	PW-1L-1	PW-5L-1	M1-2K*1	M2-4K*1
GIF-1TQ160	PW-1L-1	PW-5L-1	M1-2K*1	M2-4K*1
GIF-XTQ160	PW-1L-1	PW-5L-1	M1-2K*1	M2-4K*1
CF-Q160L	PW-1V-1	PW-5V-1	M1-2U*1	M2-3U*1
CF-Q160I	PW-1V-1	PW-5V-1	M1-2U*1	M2-3U*1
CF-Q160AL	PW-1V-1	PW-5V-1	M1-2U*1	M2-3U*1
CF-Q160AI	PW-1V-1	PW-5V-1	M1-2U*1	M2-3U*1
PCF-160AL	PW-1V-1	PW-5V-1	M1-2U*1	M2-3U*1
PCF-160AI	PW-1V-1	PW-5V-1	M1-2U*1	M2-3U*1
CF-Q160S	PW-1H-1	PW-5L-1	M1-2K*1	M2-4K*1

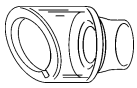
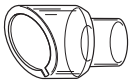
*1 These accessories may not be available in some area.

Endoscope	CLIP FIXING DEVICE	DISPOSABLE CLIP FIXING DEVICE	LIGATING DEVICE	
				
GIF-XP160	–	–	–	–
GIF-160	HX-5LR-1	HX-200L-135	HX-20L-1	HX-21L-1*1
GIF-Q160	HX-5LR-1	HX-200L-135	HX-20L-1	HX-21L-1*1
GIF-1TQ160	HX-6UR-1	HX-200L-135	HX-20L-1	HX-21L-1*1
GIF-XTQ160	HX-6UR-1	HX-200L-135	HX-20L-1	HX-21L-1*1
CF-Q160L	HX-6UR-1	HX-200U-135	HX-20U-1	–
CF-Q160I	HX-5QR-1	HX-200U-135	HX-20Q-1	–
CF-Q160AL	HX-6UR-1	HX-200U-135	HX-20U-1	–
CF-Q160AI	HX-5QR-1	HX-200U-135	HX-20Q-1	–
PCF-160AL	HX-6UR-1	HX-200U-135	HX-20U-1	–
PCF-160AI	HX-5QR-1	HX-200U-135	HX-20Q-1	–
CF-Q160S	HX-5QR-1	HX-200L-135	HX-20L-1	HX-21L-1*1

∗1 These accessories may not be available in some area.

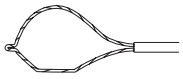
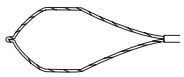
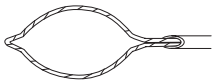
Endoscope	INJECTION NEEDLE	DISPOSABLE INJECTION NEEDLE	HEAT PROBE
			
GIF-XP160	NM-8L-1/9L-1	NM-201L	–
GIF-160	NM-4L-1 to 7L-1	NM-200L/201L	CD-21Z/120U
GIF-Q160	NM-4L-1 to 7L-1	NM-200L/201L	CD-21Z/120U
GIF-1TQ160	NM-4L-1 to 7L-1	NM-200L/201L	CD-11Z/110U
GIF-XTQ160	NM-4L-1 to 7L-1	NM-200L/201L	CD-11Z/110U
CF-Q160L	NM-4U-1	–	CD-11Z/110U
CF-Q160I	NM-4U-1	–	CD-11Z/110U
CF-Q160AL	NM-4U-1	–	CD-11Z/110U
CF-Q160AI	NM-4U-1	–	CD-11Z/110U
PCF-160AL	NM-4U-1	–	CD-21Z/120U
PCF-160AI	NM-4U-1	–	CD-21Z/120U
CF-Q160S	NM-4L-1 to 7L-1	–	CD-11Z/110U

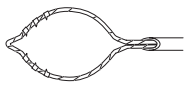
Endoscope	DISTAL ATTACHMENT			
	Straight	Oblique	Straight with rim	Oblique with rim
				
GIF-XP160	–	–	–	–
GIF-160	MH-462*1	MH-587*1	MH-593*1	MAJ-289*1
GIF-Q160	MH-463*1	MH-588*1	MH-594*1	MAJ-290*1
GIF-1TQ160	MH-464*1	MH-589*1	MH-595*1	MAJ-291*1
GIF-XTQ160	MH-466*1	MH-591*1	MH-597*1	MAJ-293*1
CF-Q160L	MH-466*1	MH-591*1	MH-597*1	MAJ-293*1
CF-Q160I	MH-466*1	MH-591*1	MH-597*1	MAJ-293*1
CF-Q160AL	MH-466*1	MH-591*1	MH-597*1	MAJ-293*1
CF-Q160AI	MH-466*1	MH-591*1	MH-597*1	MAJ-293*1
PCF-160AL	MH-464*1	MH-589*1	MH-595*1	MAJ-291*1
PCF-160AI	MH-464*1	MH-589*1	MH-595*1	MAJ-291*1
CF-Q160S	MH-466*1	MH-591*1	MH-597*1	MAJ-293*1

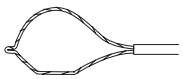
Endoscope	DISTAL ATTACHMENT	DISPOSABLE DISTAL ATTACHMENT	
			
GIF-XP160	–	–	–
GIF-160	MAJ-295*1	–	D-206-01*1
GIF-Q160	MAJ-296*1	D-201-11304*1	D-206-04*1
GIF-1TQ160	MAJ-297*1	D-201-12704*1	–
GIF-XTQ160	–	D-201-14304*1	–
CF-Q160L	–	D-201-14304*1	–
CF-Q160I	–	D-201-14304*1	–
CF-Q160AL	–	D-201-14304*1	–
CF-Q160AI	–	D-201-14304*1	–
PCF-160AL	MAJ-297*1	D-201-12704*1	–
PCF-160AI	MAJ-297*1	D-201-12704*1	–
CF-Q160S	–	D-201-14304*1	–

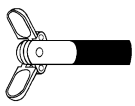
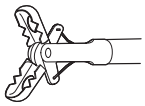
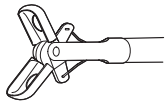
∗1 These accessories may not be available in some area.

❍ Electrosurgical accessories

Endoscope	POLYPECTOMY SNARE			
	Crescent	Hexagonal	Oval	Mini-oval
				
GIF-XP160	SD-7P-1	SD-8P-1	–	–
GIF-160	SD-5L-1	SD-6L-1	SD-9L-1/11L-1	SD-12L-1/13L-1
GIF-Q160	SD-5L-1	SD-6L-1	SD-9L-1/11L-1	SD-12L-1/13L-1
GIF-1TQ160	SD-5L-1	SD-6L-1	SD-9L-1/11L-1	SD-12L-1/13L-1
GIF-XTQ160	SD-5L-1	SD-6L-1	SD-9L-1/11L-1	SD-12L-1/13L-1
CF-Q160L	SD-5U-1	SD-6U-1	SD-9U-1/11U-1	SD-12U-1/13U-1
CF-Q160I	SD-5U-1	SD-6U-1	SD-9U-1/11U-1	SD-12U-1/13U-1
CF-Q160AL	SD-5U-1	SD-6U-1	SD-9U-1/11U-1	SD-12U-1/13U-1
CF-Q160AI	SD-5U-1	SD-6U-1	SD-9U-1/11U-1	SD-12U-1/13U-1
PCF-160AL	SD-5U-1	SD-6U-1	SD-9U-1/11U-1	SD-12U-1/13U-1
PCF-160AI	SD-5U-1	SD-6U-1	SD-9U-1/11U-1	SD-12U-1/13U-1
CF-Q160S	SD-5L-1	SD-6L-1	SD-9L-1/11L-1	SD-12L-1/13L-1

Endoscope	POLYPECTOMY SNARE		DISPOSABLE POLYPECTOMY SNARE	
	Oval with spike	Mini oval with spike	Oval	Mini-oval
				
GIF-XP160	–	–	–	–
GIF-160	SD-16L-1	SD-17L-1	SD-210L-25	SD-210L-15
GIF-Q160	SD-16L-1	SD-17L-1	SD-210L-25	SD-210L-15
GIF-1TQ160	SD-16L-1	SD-17L-1	SD-210L-25	SD-210L-15
GIF-XTQ160	SD-16L-1	SD-17L-1	SD-210L-25	SD-210L-15
CF-Q160L	SD-16U-1	SD-17U-1	SD-210U-25	SD-210U-15
CF-Q160I	SD-16U-1	SD-17U-1	SD-210U-25	SD-210U-15
CF-Q160AL	SD-16U-1	SD-17U-1	SD-210U-25	SD-210U-15
CF-Q160AI	SD-16U-1	SD-17U-1	SD-210U-25	SD-210U-15
PCF-160AL	SD-16U-1	SD-17U-1	SD-210U-25	SD-210U-15
PCF-160AI	SD-16U-1	SD-17U-1	SD-210U-25	SD-210U-15
CF-Q160S	SD-16L-1	SD-17L-1	SD-210L-25	SD-210L-15

Endoscope	DISPOSABLE POLYPECTOMY		
	Extra mini-oval	Crescent	Oval (With spiral)
			
GIF-XP160	–	SD-221L-25	–
GIF-160	SD-210L-10	SD-221L-25	SD-230U-20
GIF-Q160	SD-210L-10	SD-221L-25	SD-230U-20
GIF-1TQ160	SD-210L-10	SD-221L-25	SD-230U-20
GIF-XTQ160	SD-210L-10	SD-221L-25	SD-230U-20
CF-Q160L	SD-210U-10	SD-221U-25	SD-230U-20
CF-Q160I	SD-210U-10	SD-221U-25	SD-230U-20
CF-Q160AL	SD-210U-10	SD-221U-25	SD-230U-20
CF-Q160AI	SD-210U-10	SD-221U-25	SD-230U-20
PCF-160AL	SD-210U-10	SD-221U-25	SD-230U-20
PCF-160AI	SD-210U-10	SD-221U-25	SD-230U-20
CF-Q160S	SD-210L-10	SD-221L-25	SD-230U-20

Endoscope	HOT BIOPSY FORCEPS	DISPOSABLE HOT BIOPSY FORCEPS		DIATHERMIC CUTTER
		Alligator jaws-step	Oval	Needle type
				
GIF-XP160	–	–	–	–
GIF-160	FD-1L-1	FD-210U	FD-230U	KD-1L-1
GIF-Q160	FD-1L-1	FD-210U	FD-230U	KD-1L-1
GIF-1TQ160	FD-2L-1	FD-210U	FD-230U	KD-1L-1
GIF-XTQ160	FD-2L-1	FD-210U	FD-230U	KD-1L-1
CF-Q160L	FD-2U-1	FD-210U	FD-230U	–
CF-Q160I	FD-2U-1	FD-210U	FD-230U	–
CF-Q160AL	FD-2U-1	FD-210U	FD-230U	–
CF-Q160AI	FD-2U-1	FD-210U	FD-230U	–
PCF-160AL	FD-1U-1	FD-210U	FD-230U	–
PCF-160AI	FD-1U-1	FD-210U	FD-230U	–
CF-Q160S	FD-2L-1	FD-210U	FD-230U	KD-1L-1

EMC information

This model is intended for use in the electromagnetic environments specified below. The user and the medical staff should ensure that it is used only in these environments.

❍ Magnetic emission compliance information and recommended electromagnetic environments

Emission standard	Compliance	Guidance
RF emissions CISPR 11	Group 1	This instrument uses RF (Radio Frequency) energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Radiated emissions CISPR 11	Class B	This instrument's RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Main terminal conducted emissions CISPR 11		
Harmonic emissions IEC 61000-3-2	Class A	This instrument's harmonic emissions are low and are not likely to cause any problem in the typical commercial power supply connected to this instrument.
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	This instrument stabilizes its own radio variability and has no affect such as flicker in lighting apparatus.

❍ Electromagnetic immunity compliance information and recommended electromagnetic environments

Immunity test	IEC 60601-1-2 test level	Compliance level	Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	Contact: ±2, ±4, ±6 kV Air: ±2, ±4, ±8 kV	Same as left	Floors should by be made of wood, concrete, or ceramic tile that hardly produces static. If floors are covered with synthetic material that tends to produce static, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	Same as left	Mains power quality should be that of a typical commercial (original condition feeding the facilities) or hospital environment.
Surge IEC 61000-4-5	Differential mode: ±0.5, ±1 kV Common mode: ±0.5, ±1, ±2 kV	Same as left	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5% U_T (> 95% dip in U_T) for 0.5 cycle	Same as left	Mains power quality should be that of a typical commercial or hospital environment. If the user of this instrument requires continued operation during power mains interruptions, it is recommended that this instrument be powered from an uninterruptible power supply or a battery.
	40% U_T (60% dip in U_T) for 5 cycle		
	70% U_T (30% dip in U_T) for 25 cycle		
	< 5% U_T (> 95% dip in U_T) for 5 seconds		
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Same as left	It is recommended to use this instrument by maintaining enough distance from any equipment that operates with high current.

NOTE

U_T is the AC mains power supply prior to application of the test level.

❍ Cautions and recommended electromagnetic environment regarding portable and mobile RF communications equipment such as cellular phones

Immunity test	IEC 60601-1-2 test level	Compliance level	Guidance
			Formula for recommended separation distance (V_1=E_1=3 according to the compliance level)
Conducted RF IEC 61000-4-6	3 Vrms (150 kHz – 80 MHz)	3 V (V_1)	$d = \left[\frac{3.5}{V_1}\right]\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m (80 MHz – 2.5 GHz)	3 V/m (E_1)	$d = \left[\frac{3.5}{E_1}\right]\sqrt{P}$ 80 MHz – 800 MHz $d = \left[\frac{7}{E_1}\right]\sqrt{P}$ 800 MHz – 2.5 GHz

NOTE

- Where “P” is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and “d” is the recommended separation distance in meters (m).
- This instrument complies with the requirements of IEC 60601-1-2: 2001. However, under electromagnetic environment that exceeds its noise level, electromagnetic interference may occur on this instrument.
- Electromagnetic interference may occur on this instrument near a high-frequency electrosurgical equipment and/or other equipment marked with the following symbol:

❍ Recommended separation distance between portable and mobile RF communications equipment and this instrument

Rated maximum output power of transmitter P (W)	Separation distance according to frequency of transmitter (m) (calculated as V_1=3 and E_1=3)		
	150 kHz – 80 MHz	80 MHz – 800 MHz	800 MHz – 2.5 GHz
	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

NOTE

The guidance may not apply in some situations.
Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
Portable and mobile RF communications equipment such as cellular phones should be used no closer to any part of this instrument, including cables than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

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